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No 4.—MEAT PRESERVATION*

W. R. WOOLDRIDGE, PH.D., M.SC., M.R.C.V.S.
LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE

Among the more important influences that helped to mould primitive man into his civilised descendant may be included the gaining of a knowledge of food preservation methods. Probably the first method of meat preservation was drying of the carcass of a hunted animal, but almost concurrently with this, man began to develop animal domestication and animal husbandry as an indirect method of food preservation. By this means he was enabled considerably to reduce his hunting activities and so to develop his habitation, industry and local culture. Stationary communities developed which, until comparatively recently, were able to produce their own food largely within their own vicinity. During the last hundred years, however, community groups or cities have developed so rapidly that the actual site of the food production has been driven further and further from its consuming public. At the present time a large proportion of the world's perishable foods are transported thousands of miles, and it says much for our methods of preservation that the consequent wastage is comparatively so small. Of the perishable foods so transported meat is one of the most important.

Post-mortem Changes in Meat.—Before considering the various methods of meat preservation, it is advisable to review our knowledge of those changes occurring naturally in meat and which for the purposes of storage it is desirable to arrest. Meat is composed mainly of three tissues—muscle tissue, fat and connective tissue. Apart from any alterations induced by infection with micro-organisms, a number of changes take place, which are not the same for each type of tissue. Soon after death a state of *rigor mortis* sets in. This results in several physical changes to the muscle tissue, such as a hardening and stiffening, a loss of elasticity, a shortening of the muscle fibres, diminished transparency, the production of heat and a loss of power to contract when the muscle is electrically stimulated. It would appear that the substance of muscle[1] consists of a suspension of an almost insoluble protein in an aqueous medium containing salts, soluble proteins and other nitrogenous substances. The actual changes taking place in the production of *rigor mortis* are not yet known, but, at least, two chemical processes usually accompany its onset. Glycogen is broken down with the production of lactic acid, and phosphagen, an organic phosphorus compound of importance to muscle metabolism, is decomposed into creatine and inorganic phosphate. Rigor was, until recently, considered to be due to this production of lactic acid, but inasmuch as rigor can be induced without acid production, it would seem that lactic acid is not the exciting cause of the condition. There is some evidence to suggest that the balance of inorganic ions, *e.g.*, of sodium, potassium and calcium, plays a part in rigor production.

After the relatively rapid onset of rigor—a beef carcass usually sets within 24 hours—further changes take place. These, however, are much slower and depend upon the action of enzymes, which gradually effect changes that lead to the breakdown of the substance of the muscle fibres. The muscle becomes soft and pliable and subsequently the proteins themselves are broken down into simpler compounds. Somewhat similar autolytic changes take place in the connective tissue. Up to a point these changes are an advantage, as they increase the palatability of the meat.

The fat of meat undergoes *post-mortem* changes which lead to the production of rancidity. Two distinct types of rancidity occur.[2] The first is an oxidation process induced by ordinary atmospheric oxygen in the absence of micro-organisms, whilst the peculiarity of the second is due to the presence of moulds. In the normal process the oxidation of the fat occurs in two stages; firstly, an induction period during which absorption of oxygen is very slow and rancidity is not obvious, and secondly, a rapid period of oxidation resulting in the onset of true rancidity. The first of these changes is stimulated by light and in sunlight it is so shortened that it is almost completely eliminated. The oxidation of fats involves the production of peroxides by the reaction of oxygen at the unsaturated linkages of the fat molecules and these are subsequently converted into simpler compounds, including those acids of lower molecular weight and certain aldehydes that are responsible for the reactions of rancidity.

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Under the normal conditions of storage, meat undergoes other changes, which are mainly due to the presence of micro-organisms. It has been shown[3] that it is not uncommon for the surface of a carcass immediately after killing and dressing to have as many as a million organisms per cubic centimetre of surface. These organisms appear to be derived from such external factors as soil, straw, dung, hides, etc., and from parts of the alimentary tract such as the paunch and intestines, that are removed in the slaughter-house. Furthermore, the wash water not infrequently contains as many as twenty million organisms per cubic centimetre, and experiments on the air of slaughterhouses have shown the presence of as many as five hundred organisms per litre of air. The growth of these organisms on the carcass is facilitated by the natural autolytic processes of the meat, whereby suitable nutrient substances are produced. The actual breakdown of muscle tissue by bacteria is accomplished very largely by the soluble proteolytic enzymes which they excrete, the changes produced in the meat leading ultimately to the products of putrefaction and decay. The bacteria themselves, and especially moulds, may impart characteristic flavours to the meat. Thus certain moulds, even without extensive multiplication, impart a flavour and smell of mustiness. Furthermore, in the presence of moulds, fat is oxidised with the production of certain methyl ketones, which impart a peculiar flavour to the resultant rancidity.

The condition known as "stinking fermentation," "overheated" or "suffocated" meat, which is said to occur when carcasses are packed too closely before their body heat has had time to dissipate, may be due to the action of micro-organisms growing under partial anærobic conditions.

Meat Preservation. General Considerations.

The main object of preservation is to enable a food to retain those properties which are associated with its freshness and nutritive value for periods much longer than would normally occur. The appearance of a carcass depends largely on the transparency of the connective tissue and of the thin fatty layers covering the muscles. This appearance or "bloom," is also dependent on the colour of the muscle pigment. Normally this red pigment, hæmoglobin, is slowly changed by the oxygen of the air into a brown pigment, methæmoglobin. Factors which influence "bloom" include the extent of swabbing and dressing, the rate of cooling, the temperature of freezing and storage, and particularly those changes of temperature leading to thawing and refreezing or "sweating" of the carcass. The conditions of air circulation, humidity and contamination with micro-organisms are all important. Thus preservation of "bloom" is best accomplished by choosing that environment which will least alter the properties of the surface layers of the carcass. Unfortunately, conditions that will satisfactorily preserve the carcass in one way may be undesirable from other points of view. Thus the humidity which would be best for retaining the water content of the meat is likely to be sufficiently high to encourage the growth of micro-organisms and is not advisable for the preservation of the meat. Very often, therefore, conditions have to be so regulated that the total effect on all the processes involved is at an optimum value. Variation from the chosen conditions are soon likely to cause spoilage. Hence it is most important in food preservation to pay careful attention to the science of biological engineering, which governs not only the storage of foods in large warehouses or holds but also, when properly applied, the conditions for the packing of perishable articles in small containers. Other factors indirectly associated with methods of storage may lead to spoilage of meat. Thus escape of a gas, such as ammonia, from a refrigerating plant, or of some of the fruit essences from, say, oranges stored in an adjoining hold, may lead to the spoliation of a whole cargo of meat.

But in addition to choosing conditions that will retain the "bloom" of a carcass, it is necessary to retard those intrinsic changes which would lead to a loss in the nutritive value of the carcass. Generally speaking, the optimum conditions for the storage of meat are those which will inhibit the normal enzymatic processes of meat autolysis, diminish the rate of oxidation of the fats and of the muscle pigment, reduce to a minimum the rate of loss of moisture whilst at the same time arresting both the growth and the enzymic activity of micro-organisms. Refrigeration or storage at temperatures lower than the normal is one of the best methods employed to achieve this end, the lowered temperature slowing up both the chemical and the biological processes. In addition to temperature, the humidity, velocity of movement and the actual gaseous composition of the storage atmosphere are important. The preservation of meat by the addition of chemicals is now, except for the instance of the use of sulphur dioxide in the preservation of sausage, confined to the addition of common salt, sugar, saltpetre and such other substances as are used in the salting and pickling of meat. The application of heat is a common method used to improve the keeping qualities of food, and the canning of meat has now become a most important industry. By the latter two methods of preservation, *viz.*, salting and canning, little attempt is made to retain the exact appearance of the fresh meat, the main object of these methods being to eliminate the microbial decomposition of the food.

As the main aim of the methods of meat preservation is to keep the food as nutritious and attractive as it was originally, it is imperative to start with a good product. Much economic waste would be avoided if all meat foods, no matter whether destined to be canned, stored at low temperatures or sold fresh, were to be subjected to efficient veterinary inspection and all diseased meat confiscated at the outset. The conditions of slaughter and dressing should be improved, special attention being paid to the cleanliness of the water and cloths used in the washing down process.

Refrigeration.—Of all the methods of maintaining food in a state fit for human consumption, it may be said that cold preserves its nutritive properties and appearance most completely. Cold alone, however, is not ideal, and other factors such as the control of humidity and the composition and movement of storehouse air are equally important. There are three methods of storage at temperatures lower than the normal, and as a result we have matured, chilled and frozen meat. The essential difference between the three methods is one of temperature, the first being stored at a temperature above, the second at or just below, and the third well below that of 32° F. As, generally speaking, both biological and chemical changes are decreased by lowering the temperature, the period of storage associated with these methods is least with the matured and greatest with the frozen meat. The old practice of allowing the animal heat to dissipate before transferring the carcass to the cold room has been shown to have no real value, and the meat is nowadays placed in the refrigerator as soon as the carcass is dressed and inspected. This procedure is said to avoid the production of "bone taint."

The Conditioning or Ripening of Meat.—By this process an attempt is made to impart the maximum palatability to meat without allowing the development of the disagreeable qualities of over-ripening or of putrefaction. It may therefore be regarded as a method of short-term preservation. Experiments by members of the staff of the Food Investigation Board[4] have shown that, taking into consideration all the changes that occur during ripening—whether these be bacterial, chemical, physical or those indefinite changes associated with palatability—the most favourable period and temperature for hanging the meat is ten to twelve days at a temperature of 37° to 38° F. This temperature is not sufficiently low to arrest the enzymatic processes associated with ripening, but it is low enough to inhibit the multiplication rate of organisms, at least for a period beyond that recommended. Ordinarily meat consumed in this country is not conditioned, the fault being shared by the housewife and the butcher. If joints, especially those of poor quality, were allowed to mature before sale, there is little doubt but that the total consumption of meat would increase.

Frozen Meat.—When meat is frozen the water within the muscle fibre separates out as ice which is formed in the spaces between the fibres; on thawing, the separated water, containing a certain amount of nutritive matter and hæmoglobin, drains away. This "drip" is more copious with beef than with mutton, which, under ordinary conditions, exhibits little or no drip. Thus mutton can be frozen without damage; beef cannot. However, if beef is frozen sufficiently rapidly the ice is formed within the fibre and no drip occurs on thawing.[5] With small joints treated in this way a product almost indistinguishable from fresh beef is obtained. Unfortunately in practice it is impossible to freeze a quarter of beef sufficiently rapidly to achieve this result. An attempt has been made to market imported meat, including beef, in this country in the form of small machine-cut joints, packed in cellophane.[14] This method, although allowing the efficient freezing of the joint with practically no loss due to drip, yet suffers from the serious disadvantage that deep-set disease, which ordinarily would be discovered by the butcher in jointing, is only found at a much later period, when the whereabouts of the rest of the carcass are unknown. Neither is it possible in this method to control adequately the composition of the surrounding atmosphere as regards moisture and, say, carbon dioxide, so that growth of moulds and bacteria may be completely arrested. Most bacteria are unable to proliferate at a temperature of 32° F., but a few, *e.g.*, the achromobacteria, the organisms responsible for "slimy" meat, can grow quite well at this temperature. Many moulds, on the other hand, *e.g.*, *Cladosporium herbarum*, the organism responsible for the condition of black spot, can grow at temperatures as low as 18°F.[7] To some extent, then, the problem with frozen beef is to find the necessary conditions of thawing so that the fluid frozen outside the fibres is reabsorbed into the muscle substance. For the same freezing and thawing treatment the drip from veal is less than that from aged beef. The conditions under which the separated water will be reabsorbed depend upon many things, including the state of the flesh at the time of freezing—that is, as regards the age and breed of the animal and time interval and temperature curve since slaughter. Further, it will depend on the rate of freezing, on the lowest temperature reached, on the temperature curve of the meat whilst stored and on the rate of thawing. So far the complexity of these factors has not been sufficiently unravelled to secure those conditions essential to the marketing of large masses of

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frozen beef. The market for frozen hindquarters of beef is further restricted at the present time owing to the fact that the retailer has to thaw the meat at ordinary temperatures for periods of four to five days. If the market for frozen beef should improve, a more rapid but satisfactory method of thawing, preferably at the wholesale markets, will have to be introduced. One or two attempts at rapid thawing, such as submitting the quarter to the action of alternating electrical currents, have already been made, but with doubtful success.

Large numbers of carcasses of frozen pork are imported annually into England and subsequently made into bacon. To prevent irreversible damage such as is produced with beef, pork must be frozen rapidly. This can be achieved by freezing at 14°F.[8] For satisfactory results, however, the fat must be hard, and so, for a period prior to slaughter, the animal's diet must contain no fish oils, certain fish or meat meals or maize. At present it is not advisable to make the pork into bacon and then transport the frozen product, for although the lean will keep perfectly well if frozen at 31°F. and kept at 14°F., the fat usually develops rancidity. It may be possible to avoid this by coating the exposed surface with an ice glaze. Neither the fat of frozen mutton nor of frozen beef develops rancidity, unless the temperature conditions of storage have been such as to cause the carcasses to " sweat," that is to say, unless the temperature of storage has been allowed to fluctuate at times above the freezing point.

There is great scope for improvement in the imported edible offal trade.[9] At present the methods of freezing and packing are such that there is considerable loss of drip on thawing and by evaporation during transit. The condition of " store burn," which is characterised by the development of brown to yellow patches, is due to this loss of water by evaporation. By using a sealed container and freezing rapidly, say, in brine, both these causes of loss would be avoided. Animal glands imported into this country for the manufacture of medicinal products should be frozen hard so that no decomposition occurs, since autolytic processes increase the difficulty of isolating the active principle.

Chilled Meat.—A large proportion of the beef consumed in this country is described as chilled, and no one will dispute the fact that it is a better product than frozen beef. Strictly speaking, chilled beef should contain no ice, but actually, in practice, the term is applied to meat that has been stored at temperatures at or just above 27°F. As the average freezing point of beef[10] is about 30·2°F., although this depends on various factors such as breed, condition of rigor, etc., it follows that chilled beef will frequently contain ice. Ice-free chilled beef approximates very closely to the home-killed product, for it gives no drip, thus retaining its flavour, loses little " bloom " owing to the fact that it sweats so little when removed to ordinary temperatures, and retains the sweetness of its fat. Chilled meat may be stored safely for from six to eight weeks. Frozen meat can be stored for many months with little deterioration, as was exemplified in this country during the last war.

Atmospheric Control and Refrigeration.—As has already been pointed out, cold is but one factor inimical to the possible changes occurring in meat. Although it inhibits sufficiently the normal enzymic changes, yet it does not satisfactorily free the meat from living micro-organisms. Bacterial growth is largely arrested at the freezing point, but moulds continue to multiply at much lower temperatures. If, however, the humidity of the atmosphere is adequately controlled, giving a suitable degree of dryness, then the danger of microbial proliferation is further diminished. Unfortunately, even with controlled air currents, it is not too easy to control the humidity throughout a large storehouse or hold containing large numbers of carcasses, and so it is not surprising to find that infection with moulds is not uncommon on carcasses stored at low temperatures. A further disadvantage of cold storage, *per se*, is that few bacteria or moulds are actually killed by the temperatures used for the storage of meat, and consequently, when the carcasses are removed to ordinary temperatures, the organisms begin to grow, and often very rapidly—a process further facilitated by the concurrent sweating. An attempt is being made to overcome this difficulty by introducing carbon dioxide into the storage chambers.[11] An atmosphere of 50 per cent. carbon dioxide greatly inhibits the growth of moulds, but the resultant lower oxygen pressure actually increases the rate of formation of the brown methæmoglobin with consequent discoloration of the carcasses. With 30 per cent. carbon dioxide, however, neither the appearance nor palatability of the meat is affected, whilst mould growth is still inhibited. Experiments by Dr. Moran and his colleagues are still in progress on these lines, and it would appear that the use of lower concentrations, such as 20 per cent., or even 10 per cent., of carbon dioxide, will have a marked benefit in keeping down the number of moulds. Although carbon dioxide appears to inhibit the growth of moulds and certain bacteria, it should be remembered that when concentrations in the neighbourhood of 10 per cent. are being used, the growth of certain other organisms, such as *Brucella abortus*, is likely to be stimulated. If the combination of carbon dioxide with low temperatures does not prove satisfactory, it might prove advisable to try low concentrations of some

other gas, such as sulphur dioxide. This gas is already being satisfactorily used in the preparation for export of Irish bacon. It would not only inhibit the growth of micro-organisms, but it would probably actually kill them. Furthermore, it would tend to eliminate the rat and mouse population of the refrigerating storehouses, a not unimportant point when it is remembered that these animals may be carriers of food poisoning organisms and that they are by no means rare in the cold chambers. Finally, sulphur dioxide would oppose the formation of methæmoglobin and the meat would retain its normal red colour. There would appear to be great hopes that a satisfactory combination of atmospheric control and temperature regulation will prove to be the ideal method of preservation.

Canning.—This form of meat preservation has extended enormously in the last few years, beef, mutton and pork, including whole hams, being successfully treated in this way. The essential fact about the method is that the natural autolytic processes and, as far as possible, bacterial degradation of the meat, are avoided by a preliminary heat treatment followed by storage in a partially-evacuated hermetically-sealed tin. It would be possible to subject the food to temperatures sufficiently high to destroy both the meat enzymes and all the organisms present, but unfortunately this would result in a product whose appearance would not be sufficiently attractive. Consequently, in "processing" a temperature and period of heating is chosen which will give a product of good appearance and reduce the number of bacteria as far as possible. In actual practice Savage[12] has shown that over half of the tins of wholesome canned meat contain bacteria, many in the form of spores. Savage suggests that under the usual conditions of storage these organisms do not develop owing to the absence of air. If, however, air gains access to the tin, the ærobic spores will germinate and some of the meat proteins will be broken down. The resultant simpler breakdown products then act as food for the anærobic spores and they will start to grow, this growth spreading rapidly throughout the deeper contents of the tin, where conditions are still anærobic. A leakage of air thus leads to the spoilage of the meat. Hence, if the tins are efficiently sealed so that a partial vacuum is present and no leakage of air can occur, the canned meat will generally remain wholesome, in spite of the presence of spores of both ærobic and anærobic bacteria. The evidence in support of this view is extremely meagre.

The fact that processing does not destroy all the organisms emphasises the importance of the initial use of only the best of meats. All meat used for canning should be thoroughly examined on entry to a canning factory; it should be fresh and used as quickly as possible. The use of machinery in the subsequent handling, provided it is adequately cleaned and sterilised, reduces the possibility of introducing infection at a later stage. In this country rigid, efficient examination of meat destined for canning does not invariably take place, a fact to be deprecated all the more when it is realised that much canned meat consists of made-up products. In America, however, efficient veterinary and laboratory examination of the meat is carried out at all stages of the canning process, including an examination of the contents of a proportion of each batch of finished tins. The chief danger from canned products does not arise from putrefactive products, the toxicity of which still remains doubtful, but from infection with food poisoning organisms. The chief of these is *Cl. botulinum*. Meat so infected may show no abnormal appearance and is then difficult to detect except after exhaustive laboratory examination. The actual risk of these infections, although real, is nevertheless very small. Salmonella are frequently associated with outbreaks of food poisoning, the vehicle of infection being sometimes cooked meat. Such bacteria are occasionally present in canned meat, but this is rare, for, as non-sporulating bacteria, they are killed by efficient processing. The cause of a number of outbreaks of poisoning by canned meats has remained obscure, but Savage suggests that some of these are really due to the presence of a Salmonella toxin. Up to the present, there is no direct experimental evidence to corroborate this view.

To sum up, then, the practical conditions essential to ensure the minimum spoilage of canned products are:—

(1) meat that is fresh and free from disease and disease-producing organisms;

(2) as small an initial bacterial contamination of the meat as possible;

(3) factory conditions that minimise the bacterial multiplication taking place before the tins are hermetically sealed;

(4) a processing temperature which will ensure only the survival of spores, and as few of these as possible; and

(5) a satisfactory form of container and reliable methods of closure which will ensure and maintain a perfectly air-tight tin.

That these conditions are largely arrived at in practice is shown by the extraordinarily low percentage of instances of food poisoning due to the consumption of canned meats.

Salting. Curing. Smoked Meat.—Meat products can be rendered free from micro-organisms by treating them with various chemicals, but this method of preservation is now prohibited

in this country, except for the use of such substances as common salt, saltpetre, sugar, spices, herbs, and occasionally, in sausages, sulphur dioxide. The old-fashioned method of preserving meat by immersing it for weeks in solutions of common salt has now almost entirely given way to mild curing. This is an advantage, as the older method had the effect of hardening the lean meat and tended to cause some degree of indigestion in the consumer. All forms of meat, such as rumps, briskets of beef, ox tongues, rounds of beef, hams, bacons, pigs' feet, pigs' heads, pigs' tongues and other pig products, can be cured, the usual curing solution consisting of an aqueous solution of common salt and saltpetre. It is an advantage to add some sugar, as this imparts a mellowness to the product. A good curing solution contains 50 lb. of coarse salt, 4 lb. of saltpetre and 8 lb. of sugar in 16 gallons of water. The period of immersion of the product in this solution varies with the character and size of the meat to be treated. For instance, a rump of beef usually requires ten days' cure, but pigs' feet are only given three days. Mild cured bacon is usually treated for two days. Sometimes the joint is subsequently treated with solid salt before undergoing the usual period of hanging, during which drying takes place. It should be emphasised that for curing it is advisable to treat the meat with the saline solution as soon as possible after the loss of animal heat. Treatment with such a high concentration of salt is inimical to the growth of most organisms, but certain bacteria are able to thrive even in media containing as much as 20 per cent. of salt.

After curing, hams and bacons are generally smoked, that is to say, they are allowed to hang in an atmosphere of wood smoke for several hours. This treatment gives the joint a good nutty brown appearance, but also seems to exert some preservative effect. This, no doubt, is due to the drying effect on the surface and to the action of the formaldehyde and other antiseptics contained in the wood smoke.[13] The smoking of bacon seems to have a further beneficial effect in reducing the spoilage due to the development of rancidity in the fat.

Space forbids further elaboration of this review, in spite of the fact that there are many aspects of meat preservation that have been left untouched. It is difficult to acknowledge all sources of information in such a paper, but I am particularly indebted to the publications of the Food Investigation Board and members of its staff. It is therefore with particular pleasure that we welcome Dr. Moran, of the Low Temperature Research Station at Cambridge, to open the discussion.

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Discussion

The Public Health Section considered the foregoing paper at the first session held in the Town Hall, Llandudno, on the morning of Wednesday, September 20th, 1933, when there was a good attendance of members and delegates.

The chair was occupied by the Vice-President of the Section, Major D. S. Rabagliati, *O.B.E.*, B.Sc., F.R.C.V.S., D.V.S.M., who, after a few introductory observations by the essayist, called upon Dr. Moran, of the Low Temperature Research Station, Cambridge, to open the discussion.

Dr. T. Moran, D.Sc., Ph.D., said:—

Dr. Wooldridge in his paper has treated me very unfairly; he might at least have left me something to talk about either by deliberately omitting any reference to some important aspect of food preservation or by stating some of the facts incorrectly. He has done neither, so the best I can do is to amplify one or two points in his paper in the light of work being carried out at Cambridge.

As Dr. Wooldridge has shown, the present outlook on meat preservation can be summed up by saying that whereas in the past rough control of temperature alone was aimed at, it is now realised that to obtain the best product it is necessary to consider not only the temperature of storage but a number of other factors, including the *ante-mortem* history of the animal, the conditions in the slaughterhouse or factory from the point of view of bacterial contamination, the rate of cooling of the meat, the lighting in the store and during retail sale and the composition of the atmosphere in the store. I may say at once that all these factors are now being considered in the highly-organised chilled beef trade from South America.

With frozen meat the changes which lead to spoilage are extremely slow and, given a temtemperature consistently below 18°F., the

damage over a period of many months is inappreciable. Nevertheless, small refinements in the preparation and handling of the meat may have important economic results. To quote one case: recently we were asked to make a survey of the New Zealand frozen mutton and lamb trade and if possible to suggest modifications in the handling of the meat which would improve its "bloom," or appearance, and its quality generally. A party of scientists went out to New Zealand and followed the meat from the farm to Smithfield Market, carefully noting its temperature, appearance, weight and chemical composition at the different stages, as well as the temperature, humidity, etc., of the air surrounding the meat. One point to which they paid considerable attention was the method of cooling. In rough experiments carried out by the trade it had been found that if carcasses of lamb were placed in the freezing rooms immediately after slaughter instead of first hanging them at ordinary temperatures from twelve to 24 hours, the loss in weight at the end of freezing was reduced by about 1 per cent. This amount in a trade exporting roughly 10,000,000 carcasses annually is by no means negligible; it represents an annual amount of the order of £100,000. During the survey, however, direct experiments on a large number of lambs showed quite conclusively that any apparent saving in weight was lost on the subsequent voyage from New Zealand and, further, that the bloom of lambs frozen immediately after dressing was definitely inferior to that of those which were pre-cooled before freezing. This conclusion was in complete agreement with conclusions arrived at in the laboratory, based on the transparency of the connective tissue layer covering the carcass and on the depth of colour of the surface muscles.

On the other hand, it is essential in the case of chilled beef and definitely a safeguard with home-killed meat, particularly if it is to be held for long periods, to cool it as soon as possible to just above freezing point. There is strong evidence to prove that with heavy beef in hot weather artificial cooling will reduce the risk of "bone-tainted" or "suffocated" meat. It is a curious thing, however, that the majority of butchers are particularly averse to this operation. At one time I thought it was simply an example of English conservatism, but during a recent visit to Buenos Aires I noticed with interest that in all the large frigorificos, equipped as they are with special cooling rooms for their export beef, the beef for local consumption was rushed to the markets and shops "hot" from the slaughter floor.

In the handling of home-killed or chilled meat the hygienic conditions in the slaughterhouse determine more than anything else the condition of the meat when it is sold. Again, to give an example—we have had several enquiries concerning butchers' refrigerated boxes, the trouble being that meat stored in those boxes became slimy or developed a crop of mould or whiskers in a remarkably short space of time, in some cases after three or four days' storage. Our observations on this problem showed that in some cases the box itself was unsatisfactory either in temperature or humidity, but in a large number of cases the trouble could be traced to unsatisfactory conditions in the slaughterhouse or shop. The brownish slime which develops on meat stored for prolonged periods consists almost entirely of organisms belonging to the Achromobacter group; it becomes noticeable when the bacterial count is of the order of $10^{7.5}$ (30,000,000) organisms per sq. cm. It can be shown that at a particular temperature the period over which a piece of meat can be stored in good condition depends upon the initial bacterial load on the meat. The following are actual figures at 32°F.:—

Initial load per sq. cm.	*Time of appearance of slime.*
43	18 days
270	16 ,,
2,800	11-12 ,,
17,300	10 ,,
40,000	8 ,,

The main sources of infection of meat are apparently not so much by air-borne spores but by contact either *via* the washing and swabbing water, the cloths used to dry the meat or the hands. In one case examined a crop of mould on a piece of meat in a butcher's box corresponding to the imprint of a hand showed that the butcher was handling clean and mouldy meat indiscriminately. The ideal in any slaughterhouse is to have a continuous supply of running water for washing the carcasses and steam-sterilised cloths to dry them. Such conditions would perhaps be difficult to obtain in the small private slaughterhouse, but not in the larger abattoirs. At the same time, it needs little imagination to see that it is not an easy matter to reduce infection on the slaughter floor below a certain point. I venture to suggest that this point deserves the attention of this Congress. The modern abattoir may be a model of engineering efficiency; biologically it may be deplorably inefficient.

Dr. Wooldridge has referred to our work on the storage of chilled beef in an atmosphere containing carbon dioxide. In the laboratory this work has given remarkably clear-cut results and it is now being tested in commercial practice. In the ordinary way spoilage in chilled beef is due to the action of micro-organisms which spoil its appearance and impart to muscle and fat an unpleasant odour and flavour. Chilled beef from South America, which forms

the bulk of our supplies, is carried at a temperature in the range of 28° to 29·5°F. It is stowed in chambers cooled by brine grids without fans to circulate the air. When it arrives in this country it is on the average 30 to 33 days old, and with existing methods of transport this is approximately the limit of its storage life. It can be kept for longer periods either by circulating the air to give a lower relative humidity in the chamber or by enriching the air in the storage chamber with a little carbon dioxide. In an atmosphere containing about 30 per cent. carbon dioxide at 32°F. mould growth on meat is completely inhibited. Carbon dioxide also inhibits the growth of the Achromobacter group of organisms, the main group found on chilled beef, and in 10 per cent. carbon dioxide, for example, the storage life of chilled beef, judged by laboratory experiments, can be prolonged to about 60 days. The practical difficulty is to provide chambers for the storage of the meat which will be reasonably gas-tight. This is engaging the attention of engineers and naval architects and there is every reason to believe that it will be solved. When it is, it should provide a safe method of transport of chilled beef from Australia and New Zealand. Likewise, chilled beef from South America will be carried at a higher temperature and will further approach home-killed beef.

The statement I have given you about storage in carbon dioxide is a simple one. Given reasonably gas-tight chambers, not only would carbon dioxide be used but probably also additional oxygen to improve the appearance of the meat. The actual amounts of carbon dioxide and oxygen desirable will depend upon the temperature, duration of the journey and the humidity in the chamber. Storage in carbon dioxide has also been applied to pork and bacon. With these meats, however, the fat oxidises much more rapidly than that of beef and mutton and develops an unpleasant "linseed oil" taste. So far satisfactory results have only been obtained in concentrations of carbon dioxide of practically 100 per cent., *i.e.*, practically in the complete absence of oxygen. In such an atmosphere at 32°F. pork and bacon can be held for months in excellent condition.

As Dr. Wooldridge rightly points out, carbon dioxide is not the only gas which will arrest the growth of micro-organisms. Minute traces, for example, of sulphur dioxide, hydrogen sulphide and formaldehyde will do so. Ozone is another gas with possibilities. We have, however, given most attention to carbon dioxide because there would appear to be no possible objection to its use on physiological grounds. Most other substances would be regarded as antiseptics in the truly chemical sense and as such would be opposed not only by public health authorities but by the general opinion of the public.

Dr. Wooldridge mentions the conditioning of meat. It is a fact that meat held for a few days either at ordinary temperatures or in the controlled temperature of the chill room of an abattoir or butcher's refrigerator improves in palatability, notably tenderness. There is no improvement in flavour and apparently the change in tenderness is due to the action of the lactic acid softening the connective tissue in the muscle. Nevertheless, tenderness is the most important point nowadays in judging a sample of meat and it is possible that much of the preference for imported chilled beef over English beef is due to the fact that it is very tender, due to the long period of storage or hanging. Certainly in the best hotels and restaurants it is the rule to hang English meat for as long as three weeks before it is cooked. Conditioning as a routine procedure is being practised by certain co-operative societies, the meat, after slaughter, being cooled, run into chill rooms to ripen and sent to the retail shops some days later. There would appear to be great scope for the extension of this practice. Whilst on this point, I would like to refer to one problem that Dr. Wooldridge has not mentioned in his paper, and that is the nutritive value of chilled and frozen meat compared with home-killed meat. This is a question that is always cropping up and I would like to know if Dr. Wooldridge has any views or information on it.

Finally, Dr. Wooldridge has referred to the possibilities of rapid freezing in terms much more optimistic than recent work would, I think, warrant. We have been and are still carrying out experiments on this aspect of meat research and so far the results do not augur as well as was once promised. The process is in commercial use in the United States, but our experiments show that extravagant claims have been made for it and that it does not give a product much, if at all, superior to that frozen in the usual way. In my opinion, there is little scope for it in this country in view of the abundant supplies of chilled beef, which now promise to be increased.

Dr. Wooldridge concludes his paper by recording his indebtedness to the publications of the Food Investigation Board. As one of the staff of that Board I should like to thank him for a most interesting and valuable paper which, to me, is a masterpiece in the way it presents the essentials of the science of meat preservation so logically and so tersely.

Mr. W. Tweed (Sheffield) congratulated Dr. Wooldridge upon the excellence of his paper. He had put in a very concise form a great deal of information. They had to remember, he went on, that they were virtually only in the experimental stage of some forms of meat preservation in this country. In the abattoir at Sheffield they had provided conditioning rooms, cold

storage rooms, and a room for chilling English meat. The speaker had had four years' experience of the rooms and said he would describe a few of the simple points that had arisen during those years. They had attained the goodwill of the butchers towards the conditioning of meat, and that was saying much. At first the butchers would have nothing to do with the scheme, but during the summer just experienced they had been loud in praise of the value of the conditioning room. The conditioning room kept meat after slaughter for periods of a few days up to a fortnight, as desired. It was held there in order that the meat should ripen. The construction of the room must be such, however, that as meat went in at different times the temperature in the room must not be varied to any extent. If doors were being opened frequently they got hot meat raising the temperature, and a great deal of sweating followed. He would like Dr. Wooldridge's opinion on how those conditions might be overcome.

Mr. Tweed added that he was particularly interested in the canning of meat. At Sheffield they had certain large wholesale butchers who were also interested in the problem, and he invited Dr. Wooldridge to enlarge, in his reply, upon the references he had made to the subject in his paper. He asked particularly for information as to the whereabouts of a canning factory in Great Britain which he could view; also whether it would be practicable to can a certain type of lean, healthy cow meat with the addition of fat to bring the meat up to a certain quality and attractiveness to the public. He was desirous of finding out, in addition, whether there was a likelihood of provision being made for the marketing of canned meat in this country.

Professor G. H. Wooldridge (London) expressed considerable pleasure at a paper of that kind being presented to a body of veterinary surgeons. He thought the subject had been omitted far too long. The importance of the problems of meat preservation were increasing daily, since, of course, they were becoming dependent more and more upon imported foodstuffs for the maintenance of the people of this thickly-populated country.

There were several points in the paper that had given him room for serious thought. One of the things that had exercised his mind most was the tendency to introduce a speeding up of the process of freezing. Dr. Moran had pointed out that there were disadvantages in too rapid freezing. While the general custom had been to leave the carcass quite a considerable time until the whole of the body heat had dissipated, it might be that that method had been carried out too far because the surface bacteria in those circumstances had a far better opportunity of propagating and producing bone taint, etc. He (Professor Wooldridge) thought if they took the opposite extreme they were likely to get equal trouble, not so much in bone taint, perhaps, as in the general character and colour of the flesh. He meant its appearance and saleability. He thought a medium process would be the most useful. The danger of bone taint had been considerably reduced as a result of the success of formalin injections into the iliac veins at the time of slaughter.

They had also to consider how far too rapid freezing and too rapid defrosting interfered with the bloom of the carcass and, of course, its marketability. Housewives, in buying joints, were guided to an enormous extent by the "view" of the meat, consequently he did not think too much attention could be paid to that aspect of the question. Professor Wooldridge recalled that recently he was asked to examine a consignment of imported mutton which was actually of first quality in regard to general condition, but which certainly looked very stale. He found that the outer surface of the carcass was dull and yellowish, the attractive appearance having altogether disappeared. On examining the other portions of the carcass he found it sound and came to the conclusion that it was due to too rapid freezing, the cold blast from the screens having been applied either too soon or too severely, and he reported accordingly. Subsequently he found that the particular cargo had been shipped at a time when there was a strike at the abattoir and that amateurs or inexperienced men had been employed to manipulate the cargoes, with those disastrous results.

Insufficient attention to the rate of defrosting also affected the marketability of meat to a marked degree. A lot of what was called sweating could be avoided if defrosting processes were slowed down. If they were speeded up they would get much more of the sweating, much more of the serum and a lot more condensation moisture on the surface. Nothing was more repulsive than to see a carcass of imported mutton that had been taken out of a refrigerator and too rapidly defrosted under careless conditions.

Another point of some importance had been referred to as "flavours," and the effect of the processes upon them. Undoubtedly the public rightly thought a lot of the flavour of meat, and all smacked their lips at a nice bit of roast beef. The flavour of meat was apparently due to the presence of certain elusive aromatics; but it was doubtful whether there was much of those aromatics left in frozen beef. The loss was less marked in chilled beef. To what was this change due, he asked, and why the difference between frozen and chilled? Was it associated with lower temperature; was it the result of the length of time it had been kept,

or what was the cause really? Personally, he did not think sufficient attention had been paid, from the practical aspects of the case, to the differences between chilled and frozen meat, both from the points of view of appearance and flavour. Chilled beef in good condition was often difficult or impossible to distinguish from home-killed. A few years ago there was a case where a man was prosecuted for selling chilled beef as home-killed. Quite a body of influential opinion, expert butchers, importers, retailers and wholesalers, was ranged on either side and it was contended that where chilled meat was well handled it was utterly impossible to distinguish it from home-killed meat. He did not think, however, that the same could be said of frozen beef.

Dr. Wooldridge had referred also to the possibilities of CO_2. "I thought," Professor Wooldridge added, "that we had finished this week with our old friend *Br. abortus*, but I find we must not omit the possibility of that organism thriving under the conditions mentioned by him. It is my opinion that we can afford to neglect it entirely. We rarely eat home-killed meat raw and if *Br. abortus* is not present in huge quantities the conditions under which we take it would render it perfectly safe."

Referring to the question of handling meat before freezing, Professor Wooldridge said that some work had been done in regard to the importation of boned meat. The method adopted in the preparation was that the carcass was first boned and the meat collected into bundles and frozen into solid masses. The dangers which Dr. Moran had mentioned in the washing down of carcasses were responsible for one cargo he had examined. The cargo had gone off very badly; indeed, 50 per cent. of the parcels were stinking. The smell could not be observed from the outside at all. One or two parcels had been defrosted and in the inside were found to be wrong. He had been asked to ascertain whether the change had taken place during transhipment or before shipping, it being a question of insurance and the insurance covered only transport. The conclusion he came to was that the change had not occurred as the result of defects of transport at all, but was due to bad handling during the preparation of the beef. He took material from the inside of the bundles to examine before defrosting, by means of a brace and bit. He submitted the samples—shavings brought out from the middle—to the simple nasal test and finally found that in a large proportion of the cases the interior of the bundles was stinking. That could not have occurred during transport and the infection must have taken place in the meat before it was refrigerated. In his view, then, it was contaminated by dirty handling before it was treated.

Captain Heywood, Australia House, commenting on the references to carbon dioxide as added means of preservation, recalled that Dr. Moran had stated that the limit of storage on chilled beef from the River Plate was about 33 or 35 days. From Brisbane, which was the main shipping centre of Australia, the voyage to this country (by ordinary routes) occupied 51 days, which put it outside the ordinary range of chilled beef. It could be brought from Australia by speeding up the voyage; in fact, it had been done, and in ordinary air. But to make it a safe and commercial practice they would have to rely on carbon dioxide.

A few shipments had been made already, and the experience of one firm was very interesting. About a year ago they brought a shipment on the P. & O. steamer "Mooltan" which took, in the ordinary way, about 54 days. The experiment proved a complete failure. Other shipments followed, one from Australia proving fairly successful and another from New Zealand which was partially successful. More recently another shipment from New Zealand on the "Port Fairy," in which carbon dioxide was used for the first time, proved a complete success. The chilled beef, as chilled beef, was perhaps a little too hard, but he thought Dr. Moran would agree that the temperature could have been made a degree higher. As it was it was very encouraging.

Referring again to the shipments from Australia, Captain Heywood said that recently one cargo in gas storage turned out a complete success and another partially so. Altogether they had reason to hope that CO_2 would solve the difficultiy of bringing chilled beef from Australia. All that remained now to be done was to solve the engineering problems. So far as the laboratory work was concerned, he thought it had been amply demonstrated that the use of CO_2 would enable them to hold beef with safety an average of 60 days and more.

Mr. A. Chadwick, General Superintendent of the Markets Department, Manchester, said it was surprising that so many authorities in this country had no facilities for the chilling of meat after slaughter. He had the honour of representing an authority that provided chilling rooms at their abattoirs 38 years ago and they could quite realise in what condition the meat would have been last summer if the chilling rooms had not been in existence. There would certainly have been considerable loss all round.

Mr. Chadwick reminded the Congress that last year at Folkestone he mentioned the question of centralisation of slaughter. A report on the subject had since been issued and it was possible that some very drastic changes, in connection with the chilling of meat after slaughter, would ensue.

He suggested, as a practical outcome of the discussion on the paper, that the gentlemen

present who represented local authorities should take every means in their power to induce their respective local authorities—if they had not already done so—to take into consideration the question of providing chilling rooms in connection with the abattoirs.

He agreed with both Dr. Wooldridge and Dr. Moran that refrigeration was the best possible means of preserving meat. "It adds nothing to the meat and takes nothing away from it," he declared.

Mr. H. G. Lamont (Belfast), commenting on the reference to spoilage of canned products, said that 18 months ago he was consulted on a problem at a chicken canning factory, and he confessed that if he had had Dr. Wooldridge's paper in his possession at that time he could have solved the problem at once. The difficulty was that the tins "blew" and spoiled the finished product. Mr. Lamont described the process of examination and added that, finally, more by good luck than anything else, some of the tins which were under suspicion were sent to a physical laboratory in England, where they were tested. It was discovered that practically all the tins were admitting small air leakages. The management immediately discarded the remaining tins and arranged with a firm in England to send a new supply of tins able to withstand certain tests, since when there had been no further trouble with the canned chickens.

Sir Weldon Dalrymple-Champneys (Ministry of Health), who followed, said that the desirability of improving slaughterhouses was a subject very near to his heart, and it seemed to him that all Dr. Wooldridge had told them was a very strong argument in favour of public abattoirs. (Hear, hear.)

One point, however, had not been brought out. It was that an enormous amount of improvement was possible merely by the strict application of the existing meat regulations. It might be desirable in the future to make other regulations and introduce other practices, but he felt that they had not got all the good out of the existing regulations that they might have done. He was very interested, from the point of view of the gourmet, in the question of conditioning meat. (Laughter.) The thing that had struck him very much in his travels had been that in England they had the very best meat in the world spoiled by bad conditioning or not hanging it long enough, whereas on the Continent, where they had much poorer meat, they made the very best of what they had, not only in the way in which it was cooked but in the proper conditioning of the meat. That, he said, was his experience in the Teutonic countries in particular. Those people really did make the best of their meat, even if it were poor stuff at the beginning.

Referring to the possible dangers arising from machine-packed imported joints, the speaker said he would point out that they were being safeguarded to a certain extent by the Imported Food Regulations, under which a certificate warranting the soundness of the animal was required. Also, he said, the parts had to be identifiable.

Regarding the allusion to preservation by gas, he thought Dr. Wooldridge had propounded a most ingenious point when he referred to the possible encouragement of *Br. abortus* by the presence of CO_2. It had never occurred to him before; but he agreed with Professor Wooldridge that there was probably very little danger of infection because the meat was cooked.

Referring, in parenthesis, to the question of disease production through meat, Sir Weldon said that they might expect him, as a medical officer, to stand up and din into their ears the considerable dangers of infection by eating meat. "Speaking unofficially," he observed, "I sometimes wonder whether there is any danger at all." He thought it unlikely under the conditions in this country, where very little meat was eaten raw or partially cooked, that there was much danger of actual infection from eating meat, although poisoning by bacterial toxins seemed possible. Dr. Savage had suggested that some outbreaks of poisoning by canned meats had been due to the presence of a Salmonella toxin, but his evidence was almost entirely clinical.

Dealing with the subject of the examination of meat intended for canning in this country, Sir Weldon said that it would possibly surprise some of them to know that in spite of the enormous amount brought into this country there was a certain amount of canned meat prepared in this country for export abroad to the U.S. and Canada. The meat was carefully examined on behalf of those countries by persons certified for the purpose and all meat had to be passed by them and certificates awarded before it could be exported. It was a very wise provision, he added.

In that section Dr. Wooldridge had spoken of salt in the curing of meat, but there was no mention of the process of injecting the curing salts into the meat. In his experience it was a very common practice and apparently led to much better results than the mere application of the curing salts on the outside of the meat. The solution was injected actually into the substance of the meat, with a long needle.

Major Brennan DeVine (Birmingham) said he was much impressed by Dr. Moran's remark that the infection of meat takes place through handling and not so much through air-borne organisms. He had taken a great deal of interest in the meat regulations of 1925, and he also took the stand that if the regulations were properly carried out all meat would be kept behind closed windows, and windows of

butchers' shops would not be opened and the meat exposed to the dust of the streets. (Hear, hear.) At the time the regulations came out he had asked the Ministry of Health for a definition and the reply was "We make the regulations and you decipher them." Eventually, he said, Dr. Hancocks came to Birmingham and explained that the regulations meant that meat should be kept behind glass, or that stout material, something in the nature of linen or canvas, should be used for covering it. They all knew the dangers of contamination by flies, yet they all saw the shop windows open—as they were at Llandudno—and flies going around. They knew also that the sanitary arrangements in their own towns were not perfect. He thought it most essential that Government Departments, when they issued regulations of that nature, should definitely state what was meant by the regulations. In this case the regulations were followed by a letter issued by the Ministry of Health, which said that it was not intended that shopkeepers should keep their doors and windows closed always. In times of brisk trade windows could be kept open and customers served from the side of the street. That letter, he said, literally knocked the legs from under the regulations. Since then they had had the greatest trouble to convince retailers of the necessity of keeping their meat behind glass.

Could Dr. Moran tell them, he asked, whether organisms are borne in the dust in the streets and how many of them it took to turn meat and cause it to be unfit for human consumption? He did not think danger arose from meat infected by the diseases to which animals were subject, because where they had proper meat inspection, the inspectors cut down the meat badly affected. The great danger to meat, he contended, was the contamination which took place *post-mortem*; meat, he added, being a very fine medium for the growth of bacteria. The harm induced by the eating of infected meat, he suggested, went by degrees. Beef which had become decomposed was very harmful to eat. Decomposed mutton was not as harmful. As to the wild animals, hare could be green, but when cooked one smacked the lips at the aroma and taste which greeted one. Why was it, he asked, that a cooked partridge or pheasant, in which there was definite decomposition, was not a harmful food, yet if one had meat in the same condition it was harmful? What was the difference between the bacteria in one and in the other?

Speaking of the loss of aromatic taste—which he said might be described as the palatability of meat—he considered it was due to the too rapid freezing of the carcass. When the animal was killed, he explained, they might get *rigor mortis* set up; but, it was just the spirit of the times—all being road hogs one way or another—and people were so anxious to get the meat to the market that they rushed through all their preparations. Having raced the *post-mortem* changes, they could not get the full chemical action taking place, and that tended to destroy the perfect development of the proper palatability.

Major DeVine recalled that experiments carried out at Cambridge five years ago proved that the coarser joints of meat, which did not sell well in this country, were improved a good deal in palatability by proper hanging.

He was surprised, he said, to hear Mr. Tweed talk about the experimental stage in food preservation. Food had been preserved since the dawn of man. In connection with present-day food preparation they had to consider two things. On the one hand, there must be a cold temperature to apply to the meat, and on the other there must be the highest temperature possible for the sterilisation of the instruments and cloths, etc., used in the preparation and handling of the meat.

With regard to infection by handling, Major DeVine went on to suggest that they might get infection without any outside influence at all. Bone taint, he said, could be due to the blood being left in the arteries. About 13 or 14 years ago, he observed, they had considerable trouble from bone taint in imported meat. At that time, owing to the pressure that was brought to bear on the meat traders they experimented with different methods of slaughter. A lot of animals were shot with the free bullet and it was found that they had not that complete bleeding which resulted when animals' throats were cut. He did not know what was going to happen when the Slaughter of Animals Bill became law.

There was a line of demarcation in this country, he proceeded: the Ministry of Agriculture were the people looking after the living animal and the Ministry of Health looked after the people's food. That was quite right; but he was of opinion that there was not that close liaison between the Ministry of Health and the veterinary profession that there should be. In 1875 the Public Health Act came into force and the claims of the veterinary surgeon were not even recognised. They had suffered from it ever since. The Ministry of Health, as well as other Governmental Departments, had had it proved to them that the person to look after the animals was the veterinary surgeon, and the veterinary profession had proved during the past 50 years that they were the people to look after the slaughter of animals.

"We have had the Slaughter of Animals Bill just passed through Parliament and there is no mention of a veterinary surgeon in it," he declared.

Continuing, Major DeVine said it would be required that a man must be licensed to slaughter

before he would be permitted to have anything to do with it. It was a decision which would affect the profession as a whole.

Major DeVine concluded by saying that he was greatly interested to hear that Australia was coming into the market. He hoped the time would not be far distant when the members of the British Empire would be sufficiently dependent upon each other for all their foodstuffs. That would certainly make the Empire independent. It took four or five weeks to transport meat from Australia, but he hoped the scientific work carried out at Cambridge and other centres, and the work carried on by Dr. Wooldridge, would enable them to evolve a system whereby they could prolong the period in which meat might be brought safely to England from their distant cousins in Australia and New Zealand.

Mr. T. Parker (Newcastle) drew attention to atmospheric influences on the conditioning of meat. Describing instances of certain odd effects of the atmosphere, he said he recalled, in a district that he knew, a case where first-quality lamb slaughtered under ideal conditions at 6 a.m. on a midsummer's morning and hung for two or three hours, was carted a distance of three-quarters of a mile to a first-class shop and by six in the evening had turned absolutely green. In the same shop and from the same slaughterhouse were quarters of beef which hung ten days or a fortnight and all the time the carcass externally and internally remained in perfect condition.

He mentioned these facts because such a lot had been heard about the preparation of carcasses for hanging and the question of cooling. Personally, he thought the facts illustrated the necessity, under ordinary conditions, for absolute cleanliness both in the butchers' and the slaughterhouses. Also, he said, it illustrated what weather conditions could do. In Newcastle, which was just ten miles from the sea, he had found that changes in the direction of the wind exercised an enormous influence on the keeping qualities of meat.

Regarding the question of palatability, he submitted that *ante-mortem* influences were also deserving of consideration. He mentioned in particular methods of feeding immediately before slaughter, and whether the animals had been driven long distances and properly rested. He added that there were also to be considered the question of correct bleeding and the suitability of the atmosphere for hanging prior to the cooling process.

Mr. P. J. Howard (Ennis, Co. Clare), referring to curing processes, said that in the principal bacon factories in Ireland it had long been the practice to pump the brine through the blood vessels of the carcass as well as to apply salt externally.

He added that he hoped that a resolution would go forth from the Congress to the effect that the Ministry of Health should make it compulsory that butchers' shops should be conducted on different lines from what they were at present and that meat should not be permitted to be exposed to every danger that the atmosphere could bring along.

Mr. C. Weighton (Dunedin, New Zealand), in a reference to cooling, said that in one works where he was veterinary supervisor for two years it had been the practice to place the carcasses in the freezing chamber immediately after they had been dressed and inspected. The practice was discontinued, however, when it was found they were not getting the benefits to be expected from drying.

Mr. W. K. Johnson (Manchester), in a remark on the same subject, suggested that insufficient attention was paid to the conditioning of meat before the chilling or freezing processes. Far too much water was used, he said, in swilling down the carcasses. Water was not always as clean as it might be, neither were the cloths which were used.

The Reply

Dr. W. R. Wooldridge said, in reply:—

At the outset, gentlemen, I feel that I must thank you for the way in which you have received and discussed my paper and for the valuable information that you have added. I confess that I had strong fears when I had finished writing the paper that it would fail as an incitor of discussion. Dr. Moran has been kind enough to make several flattering references to me and the paper; these remarks I exhort you to take, as you would your meat, *cum grano salis*.

I am glad that Dr. Moran and subsequent speakers have further emphasised the importance of improving the hygienic conditions of the slaughterhouse. Whilst agreeing with Mr. Johnson that too much water should not be used in the actual swabbing of the carcass, yet a plentiful supply of good, clean water should be available for the washing down of the slaughterhouse. Dr. Moran considers that the use of SO_2 in place of CO_2 for the preservation of meat would be opposed by the public and the health authorities. This objection I think he exaggerates, as the concentration of SO_2 required in the atmosphere to inhibit mould and bacterial growth is likely to be very low—much less than 1 per cent.—and with such a low concentration the objection to its use is not likely to be strong: there is no audible objection to the practice of smoking meat, *i.e.*, submitting the meat to an atmosphere containing a low concentration of formaldehyde.

Three speakers have taken me to task for suggesting that *Brucella abortus* might be encouraged to grow on meat held in an atmosphere of carbon dioxide. They consider that

the danger likely to arise from this possibility is almost negligible. With this conclusion I am largely in agreement; my intention in mentioning such a possibility was to remind my friends at the Low Temperature Research Station, Cambridge, that whilst carbon dioxide inhibited the growth of some moulds and bacteria, it nevertheless was known to be definitely stimulating to others.

Little rigid experimental work, as far as I know, has so far been carried out on a comparison of the nutritive value of frozen and chilled meats as compared with fresh meat. Before definite conclusions could be reached a very large number of experimental animals, preferably carnivorous, would have to be fed for long periods on the necessary diets. As far as our present knowledge goes, there would appear to be little difference in value between the three sorts of meat, especially if due allowance be made for changes resultant upon different degrees of conditioning. There appears to be little difference in the vitamin contents of frozen meat and fresh meat, and although one might suspect that the loss of "drip" from a frozen joint would necessarily lower its nutritive value, this loss is very slight owing to the fact that the composition of the "drip" is practically the same as that of the meat left behind. Consequently, bulk for bulk, frozen meat may be expected to have approximately the same nutritive value as fresh or chilled meat. This reply, however, does not take into account any effect that may result from a possible difference in texture or taste, *i.e.*, in palatability.

Many speakers have referred to "sweating" of the carcass. Mr. Parker has ably illustrated the influence of the weather on the keeping qualities of meat. It is in order to standardise the environmental (or weather) conditions at the temperature, humidity and chemical composition that are best suited to the keeping of meat in a wholesome condition that the science of preservation has arisen. "Sweating" is mainly caused by the condensation of moisture from the atmosphere upon the colder surface of the carcass, and hence the slower the rate of thawing, or the smaller the difference in temperature between the meat and the surrounding medium, the less the amount of sweating on the carcass, other environmental conditions being equal. I do not agree with Professor Wooldridge when he states that quick freezing necessarily interferes with the general characters and quality of flesh. If the rapid freezing is uneven and brought about by submitting the carcass to blasts of cold air, as he suggests would explain the spoiled cargo he had to examine, then I agree with him that spoilage will result, but quick freezing, where the whole surface of the carcass is simultaneously submitted to identical cooling conditions, should not result in damage, unless the conditions are badly chosen and indirect damage results from, say, an unintentional, rapid drying of the tissue. This brings me to Mr. Tweed's question as to the best way to control "sweating." It follows from what I have said that this can only be controlled by ensuring satisfactory environmental conditions of temperature and humidity. If freshly killed carcasses are placed in a conditioning room, then they will give off both heat and moisture to the immediately surrounding atmosphere, and this may result in a condensation of moisture upon neighbouring carcasses that are already cooled to a much lower temperature. The best way to avoid such spoilage in a conditioning chamber is to place the carcasses immediately after slaughter into a pre-cooling chamber, and then as soon as the carcass temperature is lowered the necessary amount, transfer it to the conditioning room. The conditions of the atmosphere of this chamber could be safeguarded to some extent from changes inherent upon the entry of individuals by having an air block between the outer atmosphere and that within the chamber. This could be effected by having double doors, but naturally this step would not overcome the difficulties attendant upon the evolution of heat and moisture by the human beings within the chamber.

Sir Weldon Dalrymple-Champneys referred to the advantages of the large as against the small abattoir. From the butcher's point of view one great advantage of the former is that he can more satisfactorily dispose of his by-products, such as the endocrine glands. I agree that the maximum amount of good has not yet been obtained from the existing meat regulations, but that contention does not seem to me to justify standing still if there is a need for further improvement. With Sir Weldon's references to conditioning, I heartily agree. Referring to the meat-packed joints, this speaker has pointed out that all the parts have to be identifiable; this procedure, however, does not overcome the difficulty of rapidly tracing other parts of a carcass, when a joint from it has been found to be diseased. Two or three speakers have referred to the injection of salt into the carcass during salting. A description of this process, I am afraid, was omitted from the paper solely because of the difficulty of including everything in a paper of limited length. The question of curing bacon is an extremely difficult one and one which is receiving considerable attention at the present time.

Some years ago Mr. DeVine asked me a number of questions which I had difficulty in answering correctly, if at all. To-day he has seen fit to put me a number of other posers, but on this occasion, I can, at least, cheerfully refrain from attempting an answer. With his remarks on flies I quite agree. The explanation

of the different effects of decomposed meats and poultry, I am at a loss to explain, although I would remind Mr. DeVine that personal taste plays some part in this question. For instance, he states that decomposed pheasant is not harmful, but I confess that such a "dainty morsel" to me is as near toxic as any food I have ever eaten. The loss of palatability of frozen meat does not seem to be due to a too-rapid freezing; it is possibly due to the removal of the flavouring substances in the "drip."

A number of speakers referred to canning. Mr. Tweed wished to know whether it would be possible to can a certain type of lean, healthy cow meat with the addition of fat. Usually, in canning, it is necessary to remove much of the fat to avoid an over-fatty appearance, so it is quite possible that such lean cow meat would look quite well when canned, without the addition of further fat, but this question would be best answered by experiment. As centralised abattoirs become more general, I personally believe that the number of canning factories in this country will tend to increase. Mr. Lamont referred to certain difficulties at a chicken canning factory. It is frequently the custom and, in my opinion, a good practice, for all finished cans to be incubated for three weeks at 98°F. before they are allowed to leave the factory. It is then usually possible to distinguish the bad from the good tins by certain methods of touch and percussion.

In conclusion, I should like to apologise to any of my listeners whose questions I have inadvertently, owing to pressure of time, omitted to answer, and to thank you again for a patient and sympathetic hearing.

Resolution

Dr. Wooldridge's reply was followed by a discussion of the suggestion made by Mr. Howard that a resolution should be passed advocating a stricter enforcement of the Meat Regulations.

Mr. Howard moved the following resolution: "That the Public Health Section of the Congress of the N.V.M.A. is of the opinion that, in the interests of the public, it is essential that the Public Health (Meat) Regulations of 1924 should be so amended as to ensure that all meat exposed for sale in butchers' shops and stalls shall be protected from contamination by the maintaining of closed windows to such shops and stalls."

Before the resolution could be seconded, Mr. Parker intimated that he had happened to be a member of the Departmental Committee which was responsible for the regulations. He said that the question of windows came under review during the committee's discussions and it was found that a difficulty arose which, he suggested, was pertinent to the resolution. The trouble was that in large central markets it was found that, in 90 per cent. of the stalls, windows had to be kept open to permit of ordinary ventilation.

There were instances where it was advisable to keep shop windows closed, but there were other instances where it as not absolutely essential for the windows to be shut down; accordingly, he was not prepared to agree with the proposition to amend the regulations.

Major DeVine, who seconded the resolution, said he agreed that they had regulations under which it was possible for meat to be kept in a condition suitable for human consumption. But he would remind Mr. Parker that in a wholesale meat market they usually found half carcasses of beef and whole carcasses of mutton, and, as they were aware, they did not get the amount of contamination on a dry surface that was possible on a cut surface. He thought Mr. Parker would agree that chops and joints with the moist sides exposed were perfect media for the growth of the many bacteria which spoiled meat.

The resolution was carried, and accordingly was submitted as a recommendation to the Council of the N.V.M. Association for consideration.

ENGLISH GUERNSEY SOCIETY'S JUBILEE

Mr. G. Titus Barham, one of the founders, 50 years ago, of the English Guernsey Society, has been formally elected the Society's President at the annual meeting. He offered a cup, to commemorate the jubilee of the Society, to be called the Jubilee Cup, to be awarded on conditions yet to be determined, and invited suggestions for other means of celebrating the year. He was also confirmed in his office of Treasurer, which he has held from the commencement.

In consequence of the operation of the Ministry's national scheme for the testing of milk for butter fat, the Society's laboratory for testing is in progress of being dismantled. Mr. James Mackintosh, Chairman of the Advance Register Committee, reported that 34 milk recording societies have made the necessary arrangements for testing samples, but one society, in which there are four Guernsey herds, has not yet been approved, but 236 herds are now provided for in regard to testing. He also mentioned the record-breaking yield of 23,806 lb. given in her last yield, with 1,028 lb. butter fat, by Messrs. W. White and Son's cow Gipsy of Harris Mill. This is the highest yield by a Guernsey cow in the British Isles.—*Farmer and Stockbreeder.*

* * * * *

A third successive decrease in the number of sheep in New Zealand is shown by the latest returns. The total number of 27,777,000 represents a fall of 3,064,000 from the record figure of 1930, but is still 4,000,000 greater than the figure recorded for 1924.

* * * * *

A male Chinkara (Indian Gazelle) obtained by Major C. Davenport in Central India, has been accepted by the Zoological Society of London, and has recently arrived at their Regent's Park Gardens.

XUM

General Articles

CONGRESS CONSIDERATION OF MEAT PRESERVATION

LIEUT.-COLONEL T. DUNLOP YOUNG, *O.B.E.*, M.R.C.V.S., D.V.S.M., F.R.SAN.I.

The paper read by Dr. Wooldridge at Llandudno, although it contained nothing new to those engaged daily in public health work, must have been interesting and educative to those not so engaged, and it produced what he desired it to do, *viz.*, a useful discussion.

Dr. Wooldridge, on the subject of maturing of meat, stated: "if joints, especially those of poor quality, were allowed to mature before sale, there is little doubt but that the total consumption of meat would increase." Butchers know that, no matter how long poor quality home-killed meat is "hung," it never compares favourably with good chilled beef, which is produced so cheaply—hence the difficulty of selling second-grade home-killed meat. The public desire chops, steaks, and roasts, neglecting the cheaper cuts such as flanks, breasts, etc.; it therefore does not pay to "hang" poor quality meat, which is generally converted into "made-up goods."

SO_2, as stated, is considered a preservative and its use prohibited under the Preservatives Act. It was tried in the "Bullot Process" of conveying beef from Australia, no methæmoglobin was formed and the meat presented a bright, attractive appearance.

The opener of the discussion is reported to have said "the 'bloom' of lamb carcasses frozen immediately after dressing is definitely inferior to that of those which are pre-cooled before freezing, and this agrees with laboratory experiments." While some scientists seem to be satisfied on this point, practical experience over long periods with large quantities of carcasses does not confirm this opinion. A test carefully made with Argentine lamb carcasses in 1932 produced exactly the reverse result, and it is only necessary to compare the "bloom" on South American lamb carcasses, which are put directly into the chill rooms, with carcasses treated as recommended, to form an opinion. The question of "bloom" is therefore not yet settled.

There is associated with this subject another very important one, *viz.*, internal decomposition. It seems to be the opinion of some people, even those scientifically trained, that by placing carcasses too soon into a chill room, "bone taint," or internal decomposition, is produced. It is well that this idea should be destroyed at once and for all time; placing meat as quickly as possible into a chill room and bringing the temperature of the room down to 32°F., within 36 hours at longest, is the only method of *preventing* "bone taint." During 1933, as the result of not placing sheep and lamb carcasses quickly enough into the cold chambers, tons of beautiful carcasses were found unfit for food, due to internal decomposition. Mr. Tweed's difficulty with chill rooms attached to public abattoirs is one which has exercised the minds of those controlling them for many years. It is impossible to conserve carcasses satisfactorily in chill rooms when the doors are being opened and closed at all times; the nearest solution of the problem is to have a fixed hour or hours at which the cooled meat is taken out and the to-be-cooled carcasses entered. This hour should be in the early morning or in the evening, when the atmospheric air is at its lowest temperature, for obvious reasons. The air circulation system of refrigeration is preferable to the direct-expansion system for our abattoir chill rooms.

His other query as to adding fat to poor quality meat for canning purposes may be answered by assuring him that the addition of fat, not suet, to such meat is a common practice; it is only necessary to add the proper proportion, to mix it uniformly, and to make certain that the fat is quite fresh. An important point is the "pickling" of the meat, *i.e.*, whether the hot or cold method be used.

There is at present not a great demand for canned meat; the public became nauseated with it during the Great War, but the younger generation may consume more of it in the future. There are, however, enormous quantities imported from the frigorificos in other countries, produced at a very low cost and by experts associated with the making of "extract." The danger from consuming canned meat may be regarded as negligible, as proved by the quantities consumed during the Great War; this has specially been referred to previously by Dr. Wilcox, an authority on food poisoning.

The statement by the opener that "in the handling of 'home-killed' or 'chilled' meat the hygienic conditions in the slaughterhouse determine more than anything else the condition of the meat," is absolutely true; it would have been better expressed if he had said "from the time the animal is stunned until the meat is on the consumer's table"—for example, the method of washing or wiping carcasses in many of the slaughterhouses in this country is a disgrace to modern ideas of hygiene and is horrifying when compared with the method commonly in use in the frigorificos.

Sir Weldon Dalrymple-Champneys' remark that "we have not got all the good out of the existing regulations that we might have got" is true; this is due to apathy on the part of local authorities and lack of sufficient inspectors. What is necessary is that the Ministry of Health appoint, even if only temporarily, an officer of

expert knowledge and experience to visit every district and town in England and make a detailed report on how local authorities have or have not carried out the regulations. Where defects exist, the Ministry should have the necessary power to cause the remedy to be made. At present when defects are brought to the notice of the Ministry, they generally call the attention of the local authority to them: nothing results, and there the matter ends. What is wanted is a Mussolini to galvanise others into action.

Reading the paper and the report of the discussion thereon the reader is left with the impression that the subject of the veterinary side of the meat industry, especially with reference to imported meat and by-products, is not taught as fully in our colleges as it might be. Our graduates should be able to take part in any discussion on the aforementioned subjects with the knowledge and conviction that they have a good working idea of everything appertaining thereto. It is only by so doing that we can convince the public that we are what the Departmental Committee on Meat Inspection termed us—" experts "—and it is the duty of our teachers to supply to our students the necessary information.

AN INVESTIGATION OF THE URINE OF NORMAL DAIRY COWS

GEO. F. BODDIE, B.SC., M.R.C.V.S.
Royal (Dick) Veterinary College, Edinburgh.

Introduction

While analysis of a sample of urine may in many cases prove to be of considerable aid in arriving at a diagnosis in a case of bovine disease, such aid is considerably limited by the relative lack of exact information regarding the characters of normal bovine urine.

Veterinary literature does not give any detailed description of what is to be regarded as a normal cow's urine.

Smith[1] quotes from Ellenberger's " Physiologie " the statement that the urine of the ox is much the same as that of the horse, excepting that it is secreted in larger quantities. From the same source he quotes figures regarding the specific gravity and urea content.

Paton[2] dismisses the whole question in a curt paragraph: " The differences between the urines of the different herbivora are not important. The urine of the ox and the cow is more abundant and more dilute than the urine of the horse, while the urine of the sheep is considerably more concentrated."

Greig[3] deals only with reaction, specific gravity and volume in a general discussion of the urine of the domestic animals, and under the heading of " Post-parturient Dyspepsia " describes the technique of Rothera's Test.

Monvoisin[4] deals in greater detail with the actual examination of specimens but does not give a great deal of information on the subject of the urine of cows.

The object of the present investigation (which it is intended to describe here) was to ascertain as far as possible the characteristics of the urine of apparently healthy dairy cows under present-day systems of husbandry.

At the outset, not inconsiderable difficulties were encountered in regard to the tests for certain constituents, and modifications of technique had to be adopted. These will be discussed in greater detail under individual headings.

In all, 110 samples of cow's urine have been examined, and these can be divided into two groups: (1) samples taken at regular intervals throughout the autumn, winter and spring from cows which calved during the spring; (2) samples from individual cows, mostly in the spring, from various parts of the country. In addition, a 24-hour sample was collected from an 18-months old heifer which was on a maintenance diet.

The method of collection varied on individual farms, but one was impressed with the regularity with which the samples were obtained from those cows from which weekly samples were sent.

For weeks on end the samples were obtained at the same hour. It was noted, when obtaining the 24-hour sample, that urine was passed during the day at intervals of almost exactly two hours.

The significance of these observations lies in their relationship to the obtaining of samples from diseased cows, for it is probable that the attendant, by watching the habits of a sick cow, can obtain a sample with the minimum waste of time or disturbance to the animal.

Specimens were preserved during transit by the addition of a few drops of chloroform.

Analysis of Samples

Colour.—The majority of the specimens could be accurately described as being of a clear amber colour, the full range of colour being from a pale straw to a deep amber. A few specimens contained a cloud of mucus.

Specific Gravity.—The specific gravity varied from 1005 to 1050, with an average figure of 1032.

The 24-hour sample showed a diurnal variation between 1006 and 1036.

It was noted that in individual cows the sample passed at any given hour had a specific gravity variation of within very small limits.

It is obvious that with a range of specific gravity of this order, the specific gravity of any

sample from a sick cow can be of little clinical significance.

Reaction.—In practically all cases the reaction was found to be faintly alkaline, turning red litmus blue but producing no colour with phenophthalein. The remainder—with one exception—were amphoteric to litmus.

This one sample was found to be definitely acid in reaction, and on visiting the cow she was seen to be obviously unwell and was not feeding.

Albumen.—Owing to the presence of organic sulphur compounds such as indican, the use of Heller's nitric acid test was found impracticable as these compounds give an intense colour reaction at the junction of the nitric acid and urine.

The use of heat combined with dilute acetic acid was found to give satisfactory results free from any obvious fallacy.

No sample in the series was found to contain albumen.

Bile Pigment.—Tests for bile pigment dependent on a colour reaction with nitric acid were found unsatisfactory and the iodine test was adopted with apparently good results.

No sample was found to contain bile pigment.

Bile Salts.—The sulphur test was employed and in no case was there any reduction in surface tension.

Blood Pigment.—The guaiacum test was employed. In three cases traces of hæmoglobin were found in samples taken shortly after calving, the longest period after calving being ten days. None of these specimens showed blood cells in the deposit. The source of the pigment presumably was vaginal contamination.

Blood.—The deposits were stained and examined with entirely negative results.

Sugar.—Fehling's and Benedict's tests were found unreliable as, owing to the constant presence of considerable quantities of glycuronic acid or glycuronates, reagents containing copper sulphate readily give a reaction irrespective of the presence or otherwise of sugar. Nylander's bismuth reagent, however, was entirely reliable.

Fifty-eight per cent. of the samples were found to contain sugar. This was not fermented by yeast, and continued to give a reaction with Nylander's reagent after treatment with yeast, the sugar presumably being lactose.

Acetone.—It was in regard to acetone that the outstanding point of the investigation arose. Stinson[5] has described post-parturient dyspepsia of bovines as being "a primary condition of acetonæmia."

One was therefore surprised to find that in apparently healthy pregnant or lactating cows in the month of January, 31 per cent. had an appreciable amount of acetone in their urine, and that the percentage increased in February and March until all the samples from pregnant or lactating cows examined in the month of April contained acetone. Table I shows this clearly.

Taking the cases of four pregnant cows from which regular samples were obtained during pregnancy and afterwards, the following observations were made:—

(i) Cow, *Lovie,* which calved normally on April 2nd, 1933, had acetone present in the urine from January 12th to March 3rd, and again from March 24th to May 24th, when the investigation ceased.

(ii) Cow, *Molly,* which calved on January 17th, 1933, had acetone present in the urine on January 31st, March 3rd, and continuously from March 16th till May 26th.

(iii) Cow, *Topsy,* which calved on March 26th, 1933, had acetone continuously present in the urine from March 20th till May 9th.

(iv) Cow, *Aurora,* which calved on February 28th, 1933, had acetone present in the urine on February 13th, March 1st, and continuously from March 20th until May 30th.

These four cows, and all others from which urine containing acetone was obtained, were receiving a considerable but varying amount of artificial feeding, whereas in non-pregnant or non-lactating stock kept on a maintenance ration, acetone was not found in the urine.

These findings were so striking that very considerable care was taken to exclude any possible fallacies. In several cases a sample of the milk was also obtained and in each such case was found to be rich in acetone.

Where possible, visits were made to the cows; where that was impracticable an exact statement of the cow's condition was obtained from the owner. In only one case could the cow be said to be "off colour." Clinical examination of this cow showed no definite signs and she was not treated in any way; seen later, she was perfectly normal in appearance though

Table I

SPECIMENS FROM LACTATING OR PREGNANT COWS

	November 1932	December 1932	January 1933	February 1933	March 1933	April 1933	May 1933	
Total Specimens Examined	9	17	13	12	19	17	12	99
Specimens Containing Acetone	1	1	4	5	10	17	6	44
%	11%	5·8%	31%	42%	53%	100%	50%	

acetone continued to be present in her urine and milk.

These findings open up very considerable avenues both for further investigation and serious thought.

It might be argued that demonstration of acetone was of no significance in post-parturient dyspepsia. Or it might be said from the findings that all cows are suffering from an incipient state of toxæmia which may be followed by post-parturient dyspepsia or other disease, in which case it appears that the demonstration of acetone can be of little diagnostic value. The occurrence of acetone in relation to time is shown on the graphs of the urea percentage. Study of these appears to suggest that the occurrence of acetone may be associated more with the end of the winter's confinement and feeding than with the pregnancy.

Indican.—Indican was present in all samples examined; the amount increased appreciably when the cows began to go out to grass. It was noted that the amount appeared to be greater in those cases where the cows were receiving wet mash compared to those receiving dry mash.

Creatinine.—Creatinine was constantly present in small amounts; an appreciable increase takes place during the days following parturition.

Glycuronic Acid.—Testing for glycuronic acid or glycuronates was first carried out as a corollary to the testing for sugar and the fallacies with copper reagents already referred to under the heading of sugar.

Glycuronic acid was found in all specimens.

"In hepatic derangements it is stated that conjugation does not occur and glycuronic acid is absent from the urine."[6]

It remains to be seen whether, in liver derangement in cattle, glycuronic acid disappears from the urine. If this should prove to be the case the test may prove of great value in diagnosis.

Deposits.—Twenty-five per cent. of the specimens examined contained mucus. No other material was found on examining the deposits.

Urea.—It was not anticipated that much information would be obtained from an estimation of the amount of urea present in each sample. But actually the results give some rather significant curves.

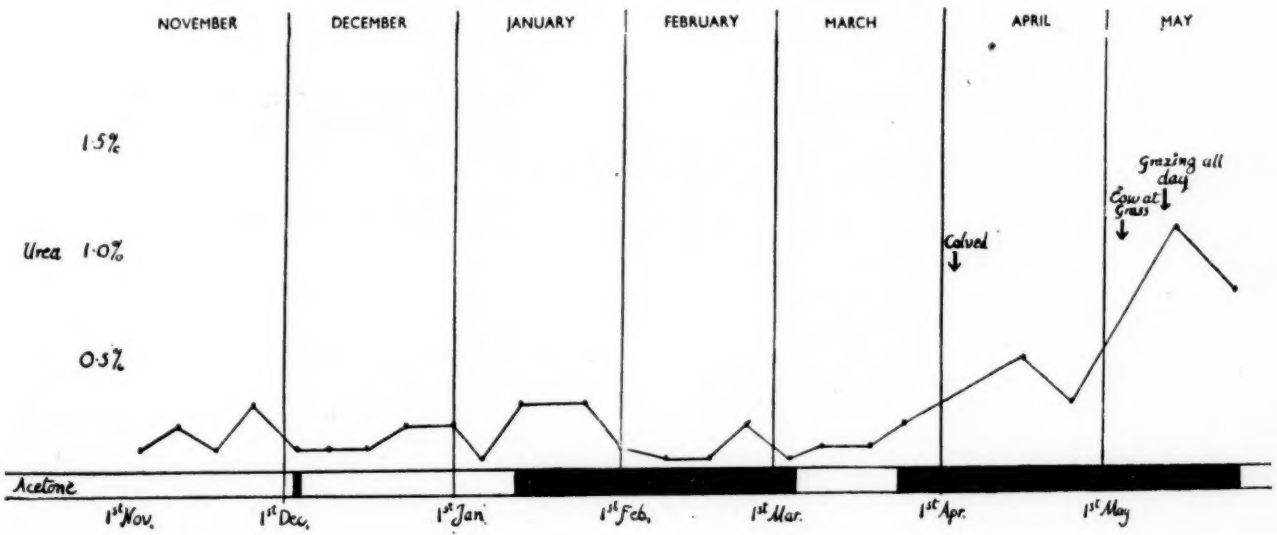
Study of the graphs shows that during the winter the amount of urea is usually of a low order, but that about the time of calving there is a temporary disturbance. The greatest disturbance takes place when the cows are first turned out to grass. The growth of grass in early summer is rich in protein and each curve shows an acute increase in the amount of urea followed by a return to what presumably would be the normal figure for the summer.

It is of interest, though not perhaps of marked significance, that specimens obtained from four cows on a farm in the south of Scotland with a bad history of losses from "fits" soon after the cows went out to grass, showed a higher urea content than any other, and also contained acetone.

It does not seem improbable that there is some association between the constant presence of acetone, which indicates disturbed metabolism, and the acute disturbance which turning cows out to grass suddenly produces and those conditions variously known as "staggers," "grass

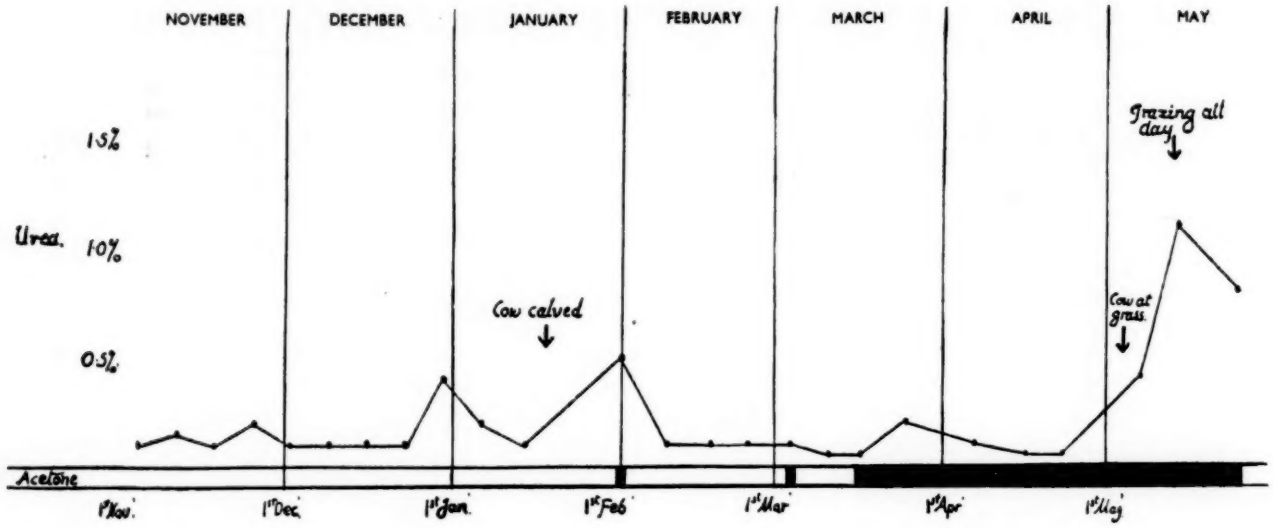
GRAPH I

Farm F.—Cow, Lovie. Cross Ayrshire. Diet: Straw *ad lib.*; turnips, 90 lbs.; earthnut cake, 2 parts; cotton cake, 1 part; crushed oats, 3 parts—3½ lbs. for each gallon of milk.



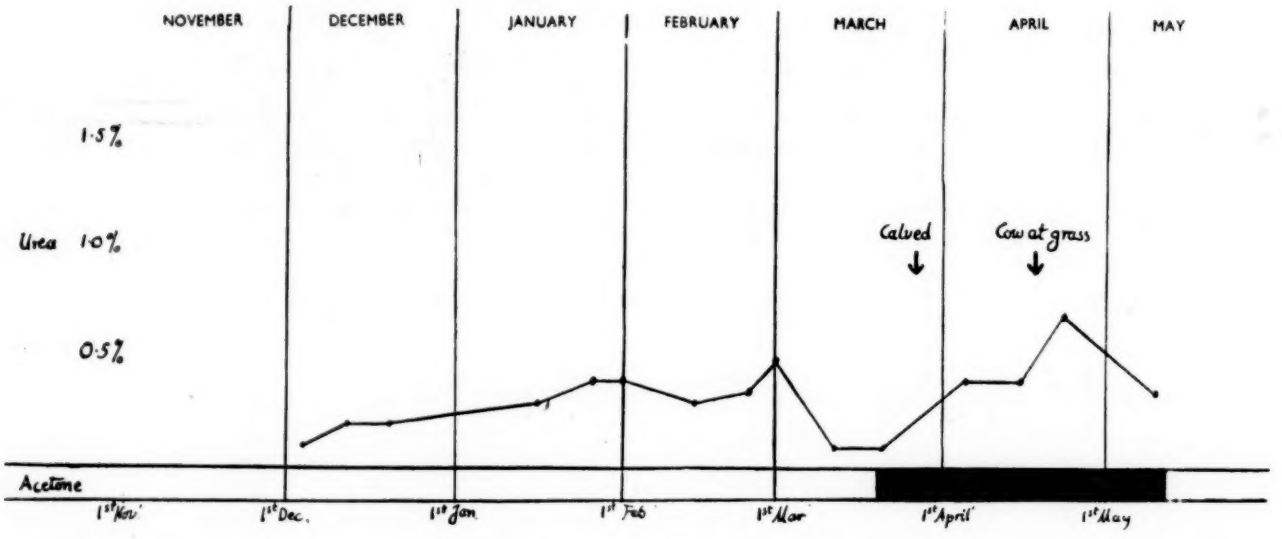
GRAPH II

Farm F.—Cow, Molly. Dairy Shorthorn. Diet: Straw *ad lib.*; turnips, 90 lbs.; earthnut cake, 2 parts; cotton cake, 1 part; crushed oats, 3 parts---3½ lbs. of this for each gallon of milk.



GRAPH III

Farm C.—Cow, Topsy. Ayrshire. Diet: Turnips, straw and hay for maintenance; bran, bean meal, maize meal, ground nut cake, masetrex, oats and potatoes for milk production.



tetany," etc. It seems probable that a cow in what amounts practically to a latent state of toxæmia cannot be able effectively to deal with the marked disturbance which may be caused if she is abruptly turned out to grass.

Further, it seems justifiable to say that the constant occurrence of acetone which has been described is incompatible with body efficiency and may even be the first stage which allows the establishment of other disease.

These findings, then, suggest the need for enquiry into the methods of present-day animal husbandry adopted for the keeping of dairy cows.

Summary

A systematic examination of a number of samples of urine from apparently healthy cows was undertaken.

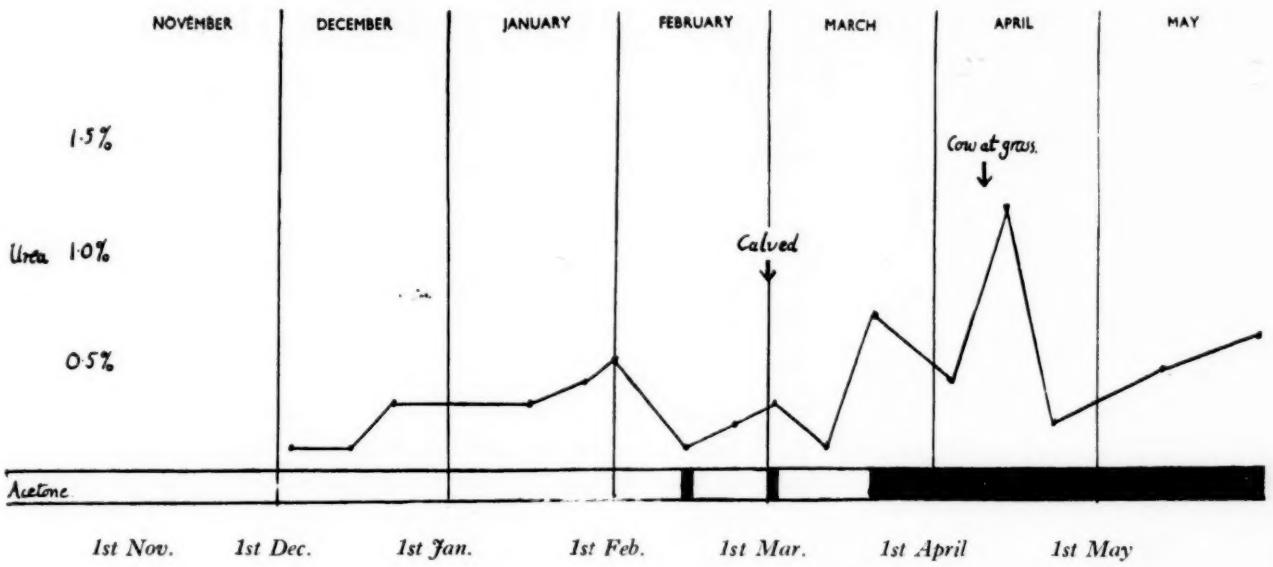
Technique of tests was adapted to suit the urine being tested.

Acetone was found frequently in the urine of apparently healthy cows.

Urea showed a marked increase in amoun

GRAPH IV

Farm C.—Cow, Aurora. Ayrshire. Diet: Turnips, straw and hay for maintenance; bran, bran meal, maize meal, ground nut cake, masetrex, oats and potatoes for milk production.



when the cows began to graze in late spring and early summer.

The possible significance of these two findings is discussed.

TECHNIQUE OF TESTS EMPLOYED

1. Albumen.—Urine boiled gently; dilute acetic acid added slowly; when frothing has ceased urine again boiled gently. Opalescence due to coagulation of albumen if present.

2. Bile Pigment.—Iodine test. A few drops of a dilute solution of iodine are added to a small amount of urine. If excess of iodine is added it may be removed by adding a little chloroform, shaking and allowing to settle to the bottom of the tube.

Bile pigment gives a green colour.

3. Bile Salts.—Hay's Sulphur Test. A small quantity of flowers of sulphur is sprinkled on the surface of a column of urine in a test tube; if these gradually settle to the bottom bile salts are present and are lowering the surface tension of the liquid.

4. Sugar. — Nylander's Bismuth Reagent. Twenty grammes bismuth subnitrate and 40 grammes Rochelle salt are dissolved in a 1,000 c.c. of 8 per cent. caustic soda solution.

The addition of one part of this reagent to ten parts of urine and boiling gives, if sugar be present, a black precipitate of bismuth.

5. Acetone.—Rothera's Test. About 20 c.c. of urine is saturated with ammonium sulphate, by shaking in a test tube. A few drops of freshly prepared dilute solution of sodium nitro-prusside are added and the tube shaken. A few drops of a strong solution of ammonia are added and if acetone is present a delicate permanganate tinge develops which gradually deepens. A brown or reddish-brown colour is not positive.

6. Indican.—An equal amount of concentrated hydrochloric acid is added to about 10 c.c. of urine, and 2 or 3 c.c. of chloroform. A very dilute solution of bleaching powder is added drop by drop and the solution shaken after the addition of each drop. A bluish-violet colour develops which disappears on the addition of further bleaching powder solution.

7. Creatinine.—A few drops of a freshly prepared dilute solution of sodium nitro-prusside are added to a small quantity of urine and dilute sodium hydroxide solution added drop by drop. The solution becomes intensely red in colour. On standing, it gradually turns yellow. The yellow solution is acidulated with glacial acetic acid. When heated it becomes green, and on standing a deposit of Prussian blue forms if creatinine be present.

Acetone gives a somewhat similar reaction, but may be removed from the urine by boiling before testing for creatinine.

8. Glycuronic Acid.—Tollen's Reaction. To 20 c.c. of urine, 5 c.c. of 10 per cent. basic lead acetate solution are added and the solution is filtered. Ten c.c. of the filtrate are measured off, 5 c.c. of concentrated hydrochloric acid and 1 c.c. of a 1 per cent. alcoholic solution of naphthoresorcin are added. These are kept in a boiling water bath for 15 minutes, and then cooled. When cold, 2 c.c. of ether are added and the tube shaken. If glycuronic acid is present the ethereal layer becomes purple. A red colour is negative.

9. Urea.—Doremus Ureometer. The solution for the ureometer is made up each time immediately prior to use, by mixing equal quantities of distilled water, a 22 per cent. solution of caustic soda and a solution containing 125 grammes of sodium bromide, 40 c.c. of bromine in distilled water to one litre.

One c.c. of urine is introduced with a special pipette and the urea is split up with the evolution of gas which is measured on the scale of the ureometer tube.

ACKNOWLEDGMENTS. — This investigation could not have been carried out had it not been for the enthusiastic co-operation of certain owners and their servants.

(*Concluded at foot of col.* 1, *page* 1133.)

The Veterinary Record

November 4th, 1933.

PRESERVATION OF MEAT

THIS issue affords ample evidence that the Provisional Committee of the Veterinary Congress were justified in devoting time in a full programme to the consideration of the subject of meat preservation. Not only the informative paper by Dr. Wooldridge, but the well-sustained discussion revealed both the importance of the subject from the public health point of view and the necessity for the modern veterinarian to regard it as of more than academic interest.

In these pages also, Colonel Young, whose unavoidable absence from such a discussion was to be regretted, contributes further, from his unrivalled practical experience, to the discussion of such economically important points as the "maturing" and storage of meat, while what may be termed the æsthetic element as represented by "bloom," flavour and tenderness of meat also finds a place.

The public health aspect of the matter inevitably predominates, however, and here light has been thrown on many features, notably, perhaps, the refutation of the common assumption that by the premature placing of carcasses in a chill room "bone taint" or internal decomposition is produced. It appears, indeed, that the exact reverse is the case, and that rapid transference to the chill room is the one essential of prevention. We are glad, too, to have the assurance that the danger from consuming canned meat may be regarded as negligible.

Veterinarians will welcome the recognition by an important official of the Ministry of Health (albeit speaking in a private capacity) of the fact that progress in the public health aspect of this matter is stultified by the failure to make adequate use of the legislative powers already possessed. Even though an increase in the inspectorate staff would appear to be necessitated if any real advance in this respect is to be made, surely the most confirmed economist must recognise the paramount claim of the consumer to the provision of a healthy meat supply.

It is also in the interests of the producer that meat inspection should be conducted by those who know their duties thoroughly in order that not one pound of meat which is fit for human food should be destroyed, nor one pound of unsound meat passed for human consumption. That is real inspection. It is so easy to say meat is unfit for food and seize it, which is generally done in any case of doubt, but surely the producer who has spent much time and labour on the production of the animal, and the person who bought it in good faith should receive careful consideration.

We earnestly endorse Colonel Young's contention that the veterinary graduate should, by his training, be placed beyond reach of any reproach that he is unable fully to play his part in any discussion of the many features involved in the production, transportation, and preservation of meat, though we would add that the proceedings reported in this issue give at least some measure of reassurance on the point.

Colonel Young has made reference to certain limitations in the training of veterinary surgeons; these limitations, we think, will definitely disappear with the tuition now given in the five years' course. This course, together with the training obtained by those qualifying for the Diploma of Veterinary State Medicine, will make the services of veterinarians in public health work even more essential than heretofore.

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[1]Smith, F. (1921). "Veterinary Physiology." Fifth edition. Page 351.

[2]Paton, N. (1908). "Essentials of Physiology for Veterinary Students." Second edition. Page 422.

[3]Greig, J. R. (1933). Hoare's "Veterinary Materia Medica and Therapeutics." Fifth edition. Pages 31 and 382.

[7]Monvoisin. (1919. Précis de Diagnostic Medical." First edition. Pages 231 *et seq.*

[5]Stinson, O. (1929). "So-called Post-parturient Dyspepsia of Bovines and its Specific Treatment." *Veterinary Record*, Vol. ix. Pages 1115 *et seq.*

[6]Beaumont, D., and Dodds. (1931). "Recent Advances in Medicine." Sixth edition. Page 154.

THE FOLDING SYSTEM OF POULTRY-KEEPING

Among the modern methods of scientific poultry-keeping is the folding system, by which the birds are kept in a house, or a house and run, which covers a fair area of land and which can, by a simple mechanical device, be quickly moved from one used part of a field to an adjoining unused part. In such a system, the birds are usually kept in small units of from 20-30, and these are moved daily to fresh land. A suitable size for the unit is 20-ft. long by 5-ft. wide and 3-ft. 6-in. high. There are various types of these units, and a note of those most commonly used is given in the Ministry of Agriculture's new Advisory Leaflet No. 188, to be obtained from H.M. Stationery Office, Adastral House, Kingsway, London, W.C.2, or through any bookseller, price 1d. net per copy.

Clinical Communications

HYDROPS AMNII

H. S. CALDWELL, F.R.C.V.S., D.V.S.M. (VICT.)
NEWCASTLE, STAFFS.

Two cases of hydrops amnii have recently been described in the *Record*,[1] and in each case treatment included tapping through the left flank. One patient, having aborted a week later, recovered; the other was found dead, two days later, her abdomen being as distended as before.

The following notes describe two cases, a cow in the last stages of the disease and a heifer which recovered; paracentesis was employed in each case.

CASE I. *November 21st*, 1932.—An aged red shorthorn cow, due to calve in a week, had been distended for some time (the owner believed that she was carrying twins), but lately her abdomen had increased in size rapidly. When I saw her, she was lying in a shed and was unable to get up. She lay on her brisket with an enormously distended abdomen, which covered a large area of floor space, which forced her stifles backwards, and caused her hind feet to point through a door behind. There was no tympany; waves in the amniotic fluid could be set in motion by pushing against either flank, and felt on the opposite side. No calf could be felt. The cow was semi-comatose, dyspnœic and cold. There were no signs of an early parturition.

A large dose of strychnine was injected and a canula was inserted through the left flank. Several gallons of fluid ran off, and the canula was re-inserted lower down in the flank. Fluid continued to run freely for some hours. The cow appeared to improve and was given stimulants, but she died during the night. Autopsy revealed one small but normal calf; the endometrium and fœtal membranes appeared pale and fragile.

CASE II. *May 12th*, 1933.—The subject was a light roan shorthorn heifer, due to calve in a fortnight, in fair condition. She had ceased eating and ruminating that day and her abdomen was distended on both flanks. She was standing; her temperature was sub-normal, her pulse feeble, and she was dull and cold. There was no tympany and no signs of parturition were exhibited. As in the first case, diagnosis was made by pressing on the flanks and rectal and vaginal exploration.

Paracentesis was performed through the left flank and a large amount of fluid was drawn off, being accelerated by pressure on the right flank. Purgatives and stimulants were administered. Prognosis was not at all hopeful. The heifer remained in a dull condition for a few days but the distension did not recur; she calved a dead calf a week later, and made a complete recovery.

It would be interesting to have reports of any cases of hydrops amnii which have been treated by dilation of the cervix and removal of the fluid *per vaginam*.

[1] CONISBEE, E. G. *Veterinary Record*, September 16th, 1933.
OLVER, W. T. *Veterinary Record*, September 30th, 1933.

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HÆMOPHILIA IN A FOX-TERRIER

A. R. SMYTHE, F.R.C.V.S., D.V.S.M.
FALMOUTH.

A pedigree fox-terrier dog puppy, about seven months old, was brought to the surgery with a history that he had been bleeding from the mouth for 48 hours.

Examination showed that the third premolar on one side had not been erupted, and it is surmised that the dog had been playing with a stick and had loosened this tooth and also caused an abrasion of the gum around the same permanent molar, which was partially through, on the other side of the jaw. There was no arterial bleeding, but a constant oozing from the tissues.

The temporary molar was extracted and a styptic applied to the gum. Local applications appeared to have very little effect, as any cessation in the bleeding was very transient.

Silver nitrate, liq. ferri-perchlor, the actual cautery proved useless, as did injections of adrenalin into the surrounding tissues. Calcium salts were administered without avail. The dog died 24 hours after being first seen.

Bleeders in the human race occur in families; it is an hereditary disease which can be traced in certain families for generations. Usually it is seen in males and not in females, although the diathesis is transmitted through the female, who herself usually remains unaffected. More recently, family histories have been published in which the female, and not the male, has been affected, and the males have escaped.

Modern medical treatment for this condition consists in the administration of serum, preferably by the intravenous route. From 10-20 c.cs. of serum from the horse, rabbit and man is said to be efficacious in preventing hæmorrhage for about a month.

Hæmostatic serum, consisting of prothrombin and thrombokinase, is also of value.

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STONY DEPOSITS IN THE GLUTEAL MUSCLES OF A HORSE

A. H. KHAN, G.B.V.C.
PROFESSOR OF ANATOMY, BOMBAY VETERINARY COLLEGE

On January 28th, 1933, one C.B. aged horse was destroyed for dissection purposes. While

students were busy in dissecting other parts of the body, I was working with one batch of students on the near side of the gluteal region. When I was dissecting the deep gluteus internus muscle of that region I found, to my surprise, five smooth stones, greyish in colour, and of different sizes, lodged in that muscle. They were scattered here and there without doing any damage to the surrounding tissues. There was no sign of an external wound or scar on the body.

The stones (of which I enclose a photograph) were sent to the Dean of the Grant Medical College, Bombay, for chemical analysis. The report of the analysis, for which I am deeply indebted to the Dean (Major Bhatia), is as follows: "The stones contain silicate of alumina and lime with traces of phosphates and sulphates."

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PECULIAR OSTEOLOGICAL FINDINGS IN THE SKELETON OF A GIR BULL

A. H. KHAN, G.B.V.C.,
Professor of Anatomy, Bombay Veterinary College

While I was taking the students round the College Museum, I was surprised to notice a freak of nature in a Kathiawar Gir bull skeleton. In this particular animal both the fibulæ ran about two-thirds of the entire length of the tibia, making osseous junction with the same at its proximal and distal extremity. Both the fibulæ are cylindrical throughout their length.

Normally, the fibulæ only run about half to one inch in length in the ox.

The above skeleton was presented to the College by Professor B. G. Knight, of the Agricultural College, Poona, in the year 1907.

The photograph of the two fibulæ will demonstrate the peculiarity.

DISEASE IN FRESHWATER FISH

In a second interim report, the committee appointed in 1929 to inquire into furunculosis and similar infectious diseases among salmon, trout, and other freshwater fish, urge the continuance of investigation and research along certain lines, and express regret that legislative action has not yet been taken on the lines suggested in their first interim report. In a further reference to those earlier proposals it is stated: "On the basis of our findings we were able to outline the measures of control which, in our opinion, were necessary to prevent the further spread of the disease in the rivers of Great Britain, and to restrict, so far as might be possible, the amount of damage done in waters already infected. . . . After due consideration of the feasible methods of achieving this purpose, which seemed to us to be a matter of urgency, we came definitely to the conclusion that legislation would be required to ensure a proper system of control, and we accordingly indicated the basis on which, in our opinion, such legislation should be founded. We hoped that immediate action to put these recommendations into effect would follow.

"The principal requirements which we stressed were: the prohibition of the importation of live salmon and trout; the control of the importation of live coarse fish; the compulsory notification of outbreaks of the disease; and powers of control over both fish farms and open rivers declared to be infected. We have reason to hope, as a result of consultations with various interested bodies, that a Bill on these lines might when introduced in Parliament be regarded as practically a non-contentious measure. We would again urge that such a Bill should be passed into law with as little delay as possible, as we are still firmly convinced that only by such complete measures as have just been indicated can the disease be restricted."

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The number of horses slaughtered under U.S.A. federal meat inspection during May, 1933, was 1,646. During May, 1932, the number was 4,571, according to service and regulatory announcements of the Bureau of Animal Industry.

Annotation

[Legislation against Cattle Plague (Rinderpest) in the Central Provinces, India. *The Central Provinces Cattle Diseases Bill,* 1933 (*Central Provinces Bill No. xxii of* 1933).*]

In a statement of objects and reasons appended to this Bill, the Member-in-Charge (Mr. P. S. Desmukh) writes as follows:—

"The province does not breed cattle in sufficient numbers and the local supply has to be augmented annually by the importation of a large number of cattle from the states on its northern borders. The itinerant cattle dealers who import these cattle also buy for sale local young stock and move their herds from market to market, from one end of the province to another. The movement of these large herds is at present unregulated and constitutes a potent agency for the dissemination of dangerous cattle diseases which destroy stock worth lakhs of rupees every year. The necessity of regulating the importation and passage of these cattle has often been urged upon Government, both by the veterinary officers of the province and the Board of Agriculture, and the Royal Commission on Agriculture recommended Central legislation to deal with the problem comprehensively. As the problem is urgent and an all-India measure may take time to enact, the Local Government has decided to undertake provincial legislation and the present Bill has accordingly been framed. The object aimed at is to make compulsory the vaccination against rinderpest of all imported cattle at stated quarantine posts, to prescribe routes and seasons for import, to prohibit the purchase by or sale to itinerant cattle dealers of unimmunised cattle and to take power to prohibit or disperse a fair or market in order to prevent the outbreak or spread of any infectious or dangerous cattle diseases. The measure is designed to guard against the spread of rinderpest, primarily, as owing to some valuable research work carried out by the provincial Veterinary Department a cheap and effective method of immunising cattle against this highly dangerous and destructive epidemic has been discovered and there is every prospect of minimising its ravages by the adoption of the measures embodied in the Bill."

The research work mentioned in the above statement and the peculiar problem of control of rinderpest in the Central Provinces have been recently described in two progress reports† published by the Director of Veterinary Services, Major R. F. Stirling, F.R.C.V.S., I.V.S. In his first report, he stated that the problem of rinderpest was a peculiar one, for India, in the Central Provinces, because this administrative unit of British India was entirely land-locked, and was surrounded for the most part by Indian States (in which hardly any attempt was made to control animal disease) and also contained a number of small States within its confines. The province, moreover, obtained a large proportion of the cattle supplies it needed for agricultural purposes from these States. The importation of these cattle was attended by danger of two kinds: namely, (1) the danger of introducing disease from without; and (2) that (a more serious one) of spreading disease along the routes traversed by the hordes of cattle, which, from September to March, entered the province in an apparently healthy condition mainly from the north and north-west boundaries and were then driven for long distances, up to 400 miles, to their destination: these cattle meanwhile frequently contracted infection at resting places and spread it to the areas passed through during their further progress. In a map Major Stirling clearly illustrates the increased incidence of rinderpest along the routes taken by the nomad cattle dealers.

The conferment of the temporary protection afforded by the inoculation of serum alone, as has been practised on a large scale in India in the past, could only be regarded as a more or less unsatisfactory and rather costly expedient to check the spread of disease in the scene of actual outbreaks. Major Stirling was therefore led first to attempt, as a system of protection for cattle exposed to risk of infection, active immunisation by the well-known serum-simultaneous method—a method which has had rather a chequered history in India, in spite of the eminent success that has attended its use in Egypt and other countries. As a widespread system of prophylaxis, however, it was soon found that this method was unsuitable for application in the Central Provinces, for potent economic reasons, namely, the high cost of the serum prescribed for inoculation relative to the generally low value of the animals to the inoculated, and the enormous numbers of cattle that stood in need of permanent protection against disease. Commencing in April, 1931, Major Stirling's Department therefore decided to try the use of a simple method of inoculation which had transpired from the researches undertaken at the Muktesar laboratory upon the transmission of rinderpest among goats, but which really had been envisaged in Koch's pioneer experiments in South Africa (1897).

The Muktesar work tended to show that after repeated passage, for a long time, in goats, the rinderpest virus became distinctly attenuated for cattle. Thus, the more susceptible breeds of cattle, such as those of European origin, could be protected by the serum-simultaneous method, when goat blood was used as the source of virus, by the inoculation of a very much smaller dose of serum than was necessary when virulent cattle blood was inoculated, in the ordinary way.

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* *Central Provinces Veterinary Journal,* 1933, July, Vol. 2, No. 3, pp. 112-115.

† Stirling, R. F. (1932). Some Experiments in Rinderpest Vaccination: Active Immunisation of Indian Plains Cattle by Inoculation with Goat-Adapted Virus alone in Field Conditions. *Veterinary Journal,* 88, 192-207. With 1 map and 6 charts.

———, —. —. Second Report. *Ibid,* 89, 290-306, with 6 figs.

Further, the naturally relatively resistant breeds of cattle indigenous to the plains of India could be inoculated with the goat virus safely alone, with hardly any visible reaction, even though they were not given a simultaneous controlling dose of serum. Starting cautiously in field conditions (for in India, among other difficulties which confront any form of intervention in cattle disease, the religious prejudices of the owners have to be taken into deep consideration), Major Stirling has now amassed records upon the inoculation of over 7,000 cattle (including buffaloes) by the goat-virus alone method, and he concludes that the experiences of his Department in the application of the method for over two years have been sufficiently varied and extensive to justify the conclusion that the method is likely to be the most suitable one for general use in conferring permanent protection against rinderpest upon the great mass of indigenous cattle (including buffaloes) in India.

The efforts of the Veterinary Department have been backed up in a most praiseworthy manner by the local Government, as is evident from the Minister's statement reprinted above. For some time, a scheme had been prepared by the Department whereby a number of inspection and quarantine camps were to be established within the borders of the province and imported cattle admitted only through such stations. The Bill under notice aims at giving effect to these proposals. When, by notification, the provisions of the Bill are extended to any area, the local Government may appoint the season or seasons during which and the route or routes by which cattle may be imported into such area, and it may establish quarantine stations for the inspection and detention of cattle along these routes. All cattle, on arrival at a quarantine station, shall be liable to be vaccinated, for a prescribed fee, according to the system which has been mentioned above, and marked, unless it is shown that the animal has been already vaccinated within a period of 18 months before arrival. (It may be noted here that Major Stirling had shown from his field experiments that the immunity following upon goat-virus immunisation lasts 18 months or longer.) No professional dealer shall purchase or sell cattle to any person and no person shall sell cattle to such dealer unless these cattle have been vaccinated within the above-stated period of 18 months. Further, to prevent outbreaks or spread of disease, the local Government, by order, may disperse, prohibit, or regulate in such manner as it may think fit the holding of markets, fairs, exhibitions, or other concentrations of cattle.

The official support given by Indian Ministers to the well-planned enterprise of their technical experts in attempting means of economical and effective control of cattle disease is of good augury. J. T. E.

Abstracts

[**Leucotropin in the Treatment of Lymphangitis of the Horse.** Dr. Kohn. *Tierärzliche Rundschau.* No. 15. April 9th, 1933. 1 table, 10 refs.]

Having previously achieved satisfactory results by the use of leucotropin in cases of lymphangitis, the author was encouraged to use it on a further series of cases and to make more accurate observations.

An intravenous injection of 80-150 c.c. of leucotropin is given as early as possible after the onset of symptoms. Except in severe cases an improvement in the size and nature of the swelling is soon apparent and movement of the limbs is much easier. Daily injections are given and in most instances the animal can be put to light work after the second dose. Prior to the use of leucotropin, the author had hesitated to advise exercise before the fourth day as stiffness and swelling were so pronounced.

A differential blood count was made on successive days in six instances before treatment and during the course of the disease. A progressive reduction in the number of leucocytes was observed.

N. S. B.

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[**Precarpal Bursitis in Horses and Cattle.** Professor Mörkeberg. *pp.* 92-120 *of the Yearbook of the Royal Veterinary and Agricultural College, Copenhagen, for* 1933. Orig. in French, with many figs. and refs.]

The author gives a systematic account of precarpal bursitis in the horse. The part affected is the subcutaneous bursa situated on a level with the bones of the carpus. Inflammation is always caused by direct injury, often of a chronic nature.

Clinically the condition is easily diagnosed by the limits of the swelling and the function of the limb is not much impaired, though there is great disinclination to bend the knee in acute cases. More rarely the tendon sheath of the extensor carpi radialis becomes inflamed and is usually easily distinguished from the above by its greater extent above and below the knee and more severe symptoms. In addition to orthodox treatment the author is in favour of the radical operation for extirpation of a greatly enlarged precarpal bursa, a long longitudinal incision being recommended.

Precarpal bursitis of cattle—knee hygroma—is discussed in greater detail and some cases, on which a radical operation was performed, are described and illustrated. It is stated on the evidence of one who examined numerous cattle after slaughter, that bovines do not normally possess a precarpal bursa, but repeated trauma of the knee can evidently give rise to one. Knee

hygromata in cattle often reach considerable size and may gradually become cornified and resemble horns; or they may become like footballs in shape. Five cases of large hygroma in cattle are described. In cases where the skin is still unaltered, extirpation by a longitudinal incision is recommended. Bursæ are usually easily enucleated at their front and sides, but have to be freed from their deep attachment by dissection. In cornified cases one must make use of what skin round the base is still normal. It is a good plan to try and conserve a large lateral or pendant flap, which can cover the hiatus left by the operation and be sutured well over on the opposite aspect of the knee. The author's cases so treated and firmly bandaged for two weeks, healed by first intention.

Although several methods of treatment applicable to the various types of bursitis are described, no mention is made to aspiration *plus* sodium morrhuate injection, which has proved of value in human and veterinary surgery.

J. E.

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[Alopecia in the Dog, and Spleen Extracts. (Trans. title.) Roger. (1933.) *Recueil de Méd. Vét. de l'Ecole d'Alfort.* clx. No. 8. 469-471.]

The term alopecia is applied to partial or general loss of hairs, feathers, or wool. Total alopecia is rare in animals. The condition is either congenital or acquired.

Diffuse alopecia may be caused by: acute infectious diseases (temperature must be sufficiently high, and there is always a regrowth), or by fatigue (gestation or prolonged lactation), or by chronic intoxication (Hg.), or by shock, or finally, by glandular insufficiency (castration in dog, which in certain cases merely leads to loss of pigmentation in the hairs).

Circumscribed Alopecia.—These cases are generally of a cicatricial type, following some chronic morbid process, *e.g.*, fevers, and suppurative dermatites due to various causes (bacterial, physical, chemical, and traumatic). They must be differentiated from loss of hairs through rubbing or scratching. The circumscribed form need not be cicatricial, and may arise either secondarily to a traumatism, or be of glandular origin.

The author describes the successful use of splenic medication in three old-standing alopecia cases in dogs, and not of an eczematous type.

In one case raw spleen at the rate of 100 grms. per day was fed for a month. In the other two cases daily injections of splenic extracts (splenine, 0·8 grms. daily) were used.

All three cases were house dogs getting little exercise. The author thinks there is a correlation between the return to normal of the spleen (and its hæmatopoietic functions leading to increased oxidation), and functions of liver; and that the latter organ is stimulated as regards its detoxication properties.

C. V. W.

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[Reflections on Pleuro-pneumonia of Goats in Greece, and a Contribution to its Experimental Study. Stylianopoulos, M. *Rev. Gen. de Med. Vet.* Vol. xlii. No. 499.]

Pleuro-pneumonia of goats was first observed in Greece in 1920 following the importation of goats from Asia Minor. The disease from that time assumed epizoötic proportions because of the successive importations of animals for slaughter until the Government introduced measures regarding quarantine, and these latter put an end to fresh outbreaks. The outbreak which occurred in 1930 is the one which the author has studied more particularly. He observed that usually 98·5 per cent. of herds become affected, while the mortality varies with the season. In winter (December-February) 93·8 per cent. commonly succumb, in spring the death-rate falls to 73 per cent., and in summer just below 60 per cent. The disease usually appears five to six days following the introduction of an affected animal. Spread occurs much more quickly in winter than in any other season, transmission taking place by direct contact. The intensity of the symptoms shown by an animal depends on the extent of the lesions localised in the lungs and thoracic cavity. Temperature rises quickly to 40-42°C., followed by lung symptoms. The animal is weak and seeks shelter apart from other members of the herd, suffers great thirst, hepatisation of the lungs ensues, the animal becomes much thinner, death occurring four to ten, sometimes 15 days after the first symptoms. The chief lesions observed are hepatisation of the affected lung or lungs with fibrinous deposits on the pleura and pericardium, an exudate containing fibrinous matter being present in both sacs. The other organs of the body show no visible alteration.

No complete transmission experiments had previously been carried out on this disease. The author was able to set up the disease in a series of animals by inoculating lung tissue kept in 50 per cent. glycerine at 4°C. after 13 days' storing. Animals kept in contact with infected animals also contracted the disease.

A vaccine was prepared from pleural exudate with 4 per cent. formalin added, 10 c.c. of this emulsion being used on each animal. This was used on a herd of 90 animals of which 14 already showed signs of the disease, 72 animals being inoculated, while four were left as controls. Up to three weeks after vaccination 27 goats died, but thereafter there were no further cases. The author considers that results are encouraging, but experiments on a larger scale are essential to prove the efficacy of this method of vaccination.

D. W. M.

Report

The National Institute for Research in Dairying

ANNUAL REPORT, 1932

The Institute once more makes an appeal for funds in order to meet immediate necessities and prevent retrogression; it hopes that the pioneer work which has been and is still being done to aid the production and distribution of milk of a high quality and to assist in the manufacture of dairy products of high food value will be recognised, when the need to sell milk to meet financial requirements may not be necessary.

The wide range of work undertaken by the Institute is emphasised by the fact that during the year the following items of machinery were tested: bottle washing machine, milk refrigerator, automatic cattle drinking bowl, milk strainer, milk distributor, bottle capping machine, milk filter discs and milking machines.

DAIRY HUSBANDRY DEPARTMENT.

Dairy Herd.—The dairy herd consists of 54 cows, 48 heifers, 25 calves and three bulls, one of which has been kept for nine years and continues fit and in good health. The large number of home-reared heifers and calves must be a satisfaction to the management.

The average milk yield of the cows during the year was 8,399 lbs., an increase over the previous year.

The herd has been successful in herd competitions.

Crops.—One hundred and forty-nine and a half acres were cultivated and it is noted that no swedes were grown, but there were six acres of cabbage and kale, 24 acres of lucerne and 15 acres of silage crops.

Experimental Work.—For the fourth year work has been continued upon "A Study of Typical English Milk." A full record of the cows in this small representative herd is given, including calvings, milk yields, days in milk and fat content of milk.

Calf Feeding Experiments.—A mixture of dried separated milk and dried whey was used as a substitute for whole milk. It was found useful for rearing heifer calves intended for the herd, but not satisfactory for the production of veal.

Causes of Removal from Dairy Herds.—An investigation on this subject was commenced in 1929 and has been continued. A report upon the data is to be published.

Work has also been carried out by this department upon inheritance of milk qualities, winter feeding of young dairy cattle, and the manufacture of silage.

CHEMICAL DEPARTMENT.

A Study of Typical English Milk.—It was found that during the period March 17th-May 25th the morning's milk had a fat percentage below 3 per cent., the most marked changes being associated with the physical and chemical properties of the fat.

The freezing point of milk has been found to be constant; in this way samples to which water has been added can always be distinguished.

The Solids-not-Fat Content of Milk.—It has been found that when the solids-not-fat are low the total nitrogen is low. With samples of high solids-not-fat content, 6 per cent. of the total nitrogen is non-protein nitrogen; with a lowering of the solids-not-fat the non-protein nitrogen may increase to 15 per cent. of the total nitrogen. High chloride content is accompanied by a high non-protein nitrogen.

Nutritional Value of Raw and Heated Milk.—This investigation has been in progress for the past four years.

The feeding of sterilised milk has been discontinued as no generation beyond a second could be weaned, but a corresponding group receiving raw milk has continued to breed and lactate through a succession of six generations.

Estimations of the hæmoglobin and red cells of the blood and analysis of the bones of the animals of both groups are being carried out.

Study of the Vitamin Content of Type Milk as Affected by the Season and Nutrition of the Cow.—It is intended to carry out this study for a period of two years. The first year is just nearing completion and for the purpose the year is divided into: (1) winter (stall feeding); (2) summer (grass feeding), and (3) intermediate autumn period.

It has been found that the difference in the vitamins A and D values between summer and winter milk is very marked.

Disposal of By-Products.—The apparatus for drying whey is giving good results on a practical scale.

BACTERIOLOGICAL DEPARTMENT.

Red Spot in Cheese.—There seems to be some evidence to show that the organism responsible for this discolouration may eventually be proved to be a saprophyte of the cow's udder.

Carbolic Taint in Sterilised Milk.—The department have been able to give advice upon this subject which, if carried out, should eliminate the trouble.

The Identity of Coliform Organisms in Milk and Bovine Fæces.—It has been shown by Chalmers that all coliform organisms in milk are not of fæcal origin. This has been confirmed.

Viability of the Bovine Tubercle Bacillus.—During 1931, when the summer was characterised by lack of sun and excessive rain, the bacillus was found to remain alive in infected dung for 178 days in the open, and that grass remained infective for 49 days from the time of infection.

Under their Milk Control Scheme this department has tested during the year 2,866 milk samples, and the Advisory Department have tested 2,430 samples in connection with clean milk competitions.

PHYSIOLOGICAL DEPARTMENT.

In the study of Milk Secretion in relation to Blood Composition, significant correlation has been found to occur between the values obtained for $\frac{\text{sodium}}{\text{diffusible calcium}}$ in the blood and $\frac{\text{solids-not-fat}}{\text{fat}}$ in the milk.

THE DAIRY.

A large number of experimental cheeses and butters have been made in connection with the work of other departments, and supplies of butter were made for the Chemical Department in their work upon the Vitamin Value of Milk.

PAPERS.—The following papers, which are of interest to the veterinary profession, have been published during the year: "The Feeding and Growth of Young Dairy Stock"; "Normal Growth of Dairy Cattle"; "Milk Deficient in Solids-not-Fat. An Investigation on a Herd of Cows in Hampshire"; "Eradication of Tuberculosis from Cattle Herds"; "The Feeding of Dairy Cows"; "Investigation into the Causes of Removal of Cows from Dairy Herds"; "Milk Secretion in Relation to Blood Composition."

W. L. L.

ANIMAL DISEASE IN THE FREE STATE

During the period January 1st to October 15th, 1933, the number of outbreaks of sheep scab in Saorstat Eireann reported to the Department of Agriculture was 194, as compared with 124 outbreaks during the corresponding period last year.

The number of outbreaks of swine fever from January 1st to October 15th, 1933, totalled 31, involving the slaughter of 446 swine as diseased or suspected, against 98 outbreaks and 1,295 swine slaughtered in the corresponding period last year.

The number of outbreaks of tuberculosis in animals in Saorstat Eireann reported during the nine months ended September 30th, 1933, was 1,673.

Returns were heaviest from County Kerry, with 340 outbreaks. Limerick Co. was next with 334 outbreaks, Tipperary South Riding returned 232, Cork 141, Donegal 88, Clare 82, and Waterford 69.

NATIONAL VETERINARY MEDICAL ASSOCIATION OF GREAT BRITAIN AND IRELAND

Quarterly Meeting of Council

The quarterly meeting of Council of the Association was held in the Library of Conway Hall, Red Lion Square, London, on the afternoon of Tuesday, October 3rd, 1933.

The chair was occupied by the President, Mr. W. Nairn, of Blairgowrie, and there were also present Messrs. L. S. Balls, H. Bell and H. W. Steele Bodger, Captain H. S. Cockburn, Captain J. C. Coleman, Major T. Dalling, Lieut.-Colonel J. A. Dixon, Major A. C. Duncan, Messrs. E. P. Edwards, H. Gooch and H. W. Griffiths, Captain J. R. Hewer, Captain H. Tudor Hughes, Mr. H. V. Hughes, Major H. Kirk, Mr. E. C. Lloyd, Dr. R. Lovell, Mr. J. W. McIntosh, Professor J. Macqueen, Messrs. G. P. Male and G. T. Matthews, Major-General Sir John Moore, Mr. R. Barons Nelder, Major R. H. H. Over, Mr. J. O. Powley, Major D. S. Rabagliati, Lieut.-Colonel P. J. Simpson, Major F. J. Taylor, Captain W. K. Townson, Messrs. Wm. Tweed, J. Willett, R. A. Willett and W. Woods, Professor G. H. Wooldridge and Dr. W. R. Wooldridge, together with the Hon. Secretary (Captain J. R. Rider), the Solicitor (Mr. C. O. Langley) and the General Secretary (Mr. F. Knight).

The PRESIDENT immediately called upon the Secretary to read the minutes of the two meetings of Council held at Llandudno. These minutes having been read, they were confirmed and signed as correct.

CORRESPONDENCE

(1) From the following members of Council, apologising for their inability to attend: Captain J. R. Barker, Dr. O. Charnock Bradley, Professor J. B. Buxton, Mr. Duncan Cumming, Mr. H. W. Dawes, Mr. P. F. Dolan, Mr. A. A. Donnelly, Professor S. H. Gaiger, Mr. A. Gofton, Mr. James Macfarlane, Major J. G. McGregor, Captain S. J. Motton, Mr. L. Norman, Captain A. W. Noel Pillers, Captain R. Simpson, Major A. Spreull, Mr. H. P. Standley, senr., Mr. Alex. Thomson, Dr. A. W. Whitehouse and Lieut.-Colonel T. Dunlop Young.

(2) From Dr. Griffith Evans, of Bangor, addressed to the immediate Past-President—who was in office on the occasion of the Annual General Meeting from which a message of affectionate esteem was sent to Dr. Evans—in the following terms:—

Brynkynallt,
Bangor,
N. Wales.

September 23rd, 1933.

"Dear Colonel Simpson, *President, N.V.M. Association*,

"Your very kind letter of the 21st inst. communicating the 'heartiest good wishes,' etc., of the Congress, surprised me. I cannot respond as I feel. Of course, I am deeply gratified by the recognition of those best able to judge what I have done, but I am conscious of having done little publicly for the veterinary profession, and my efforts in the Army were thwarted by my superior, of whom I am reminded by reports of your Congress discussing *'Roaring,'* which Fleming claimed cured by a surgical operation he found in Germany.

"I am in wonderfully good health generally and in enjoyment of life, aged 98, and though bed-ridden for several years with both hips fractured, I have always taken pleasure in the scientific and social progress of the profession. I preferred thinking of myself as a little ferment hid in the lump—a particle of that ferment.

"Yours truly,

GRIFFITH EVANS."

The letter was received with loud applause.

[The following letter, also addressed to the President in office at the time of Congress, has recently been received from Mr. Mark Tailby, of Birmingham, who had been similarly remembered by the Annual General Meeting at Llandudno:—

85, Harborne Road,
Edgbaston,
Birmingham.

October 16th, 1933.

"The President of the National V.M.A. of Great Britain and Ireland.

"My Dear Sir,

"I had great pleasure and surprise on September 21st in receiving such a delightful letter from so distinguished a member of the veterinary profession. I am very grateful to you and all the members for conveying to me such kind expressions of goodwill and hearty wishes —almost too much to realise in waning life.

"*Now for Congress!* I hope the attendance was fully up to your anticipations. My earliest recollections of 'Congress' were at a meeting in the year 1867 held at the 'Hen and Chicken' Hotel, New Street, Birmingham. I was a young member of 27 years of age; there were about 30 important members from London, Liverpool, Manchester, etc. My late tutor, Mr. George Bodington, then in Birmingham, and subsequently President of the West of England V.M.A., took a most prominent part in the cause. He insisted on Congress and carried his point: this and further details are to be found in *The Veterinarian* of May, 1867.

"In my early career I did not engage in literary work but devoted my whole time and energy to my practice and particularly to infectious outbreaks which occurred in Birmingham, namely, glanders and farcy, which were imported by a 'bus company from Liverpool. Subsequently they sold out and I was instructed at the transfer to inspect all the stock, and found about 20 affected with glanders and farcy. Later on, in practice, I had a case of rabies in a horse—also one in a Newfoundland dog. I was engaged in an outbreak of epizoötic pleuropneumonia in cattle, and once was called in to see a leopard at the Birmingham Zoo, which was infected with farcy by eating raw horse flesh which was 'glandered.'

"During my early days I was appointed Civil Veterinary Surgeon to the Army, an appointment which continued for about 36 years. The officers treated me with great respect and kindness, and the 17th Lancers (D Squadron) in 1895 gave me a beautiful cut-glass claret jug mounted with silver and a silver cigarette case.

"I again thank you for your courteous and affectionate letter, which will gladden the heart and refresh the mind concerning 'Congress—1933' with the name and good work of Lieut.-Colonel Simpson, J.P., F.R.C.V.S.

"Sincerely yours,

MARK TAILBY."]

(3) From Dr. E. G. Annis, Acting Principal of the Royal Institute of Public Health, and dated September 5th, 1933, in the course of which it was stated that the letter was accompanied by a copy of the Journal of the Institute, from which it would be seen what had resulted so far from the operation of their Pure Milk Committee. One of the points they particularly stressed before the Committee on Cattle Diseases of the Economic Advisory Council was the necessity of the appointment on every local authority's staff of a sufficient number of qualified veterinary officers.

"On behalf of myself and the Council of this Institute," said the writer, "I would like to tender to your Council and the members of your Association who represented them on our Pure Milk Committee, very sincere thanks for the great assistance they were to us in the matter."

The PRESIDENT enquired if anyone wished to make any comment on that letter, adding that he might say that Mr. Male and Major Rabagliati were on the Pure Milk Committee of The Royal Institute of Public Health.

Major D. S. RABAGLIATI observed that he was present at two or three meetings of that Committee, which finally appointed a sub-committee to consider the whole question. He could not serve on that, but he thought he was right in saying that Mr. Bywater (representing the Corporation of West Ham) got together a great many statistics which were of great use to the Institute.

The position was that Mr. Male and he (the speaker) went in the first instance, and he thought Mr. Bywater carried on.

(4) From Captain J. R. Rider, of Darlington, dated September 30th, 1933, requesting the Secretary to convey to the Council his warm thanks for their action in nominating him to the office of Honorary Secretary— an action which received the approval of the Annual Meeting. It would be his endeavour to continue to serve the interests of the Association to the best of his ability. (Applause.)

(5) From Messrs. Fowler, Langley and Wright, of Wolverhampton, returning thanks for their re-appointment as Solicitors to the Association.

MEMBERSHIP OF THE ASSOCIATION

The Secretary informed the Council that the number of members of the Association at September 30th, 1933, was 1,639: since that date five members had been lost by death, and there had been two new members, making the membership at the date of that meeting 1,636.

The Obituary List was now read, Council standing in tribute the while.

New Members.—On the proposition of Major Over, seconded by Major Rabagliati, Messrs. J. Bradshaw (Torquay) and Mr. G. F. Pickering (Battle) were elected to membership.

Reports of Committees

Organising Committee.

Captain J. R. Rider, Chairman, read and moved the reception of the following report of this Committee:—

A meeting of the Organising Committee was held at the Offices of the Association on Monday, October 2nd, with the Hon. Secretary (Captain J. R. Rider), in the Chair.

The minutes of the previous meeting were read and signed as correct.

The Committee gave consideration to the replies received from Divisions relative to the question of the registration and control of canine nurses. These showed that a majority of the Divisions were opposed to the proposals, and the Committee therefore decided that the time was inopportune to pursue the matter.

They wish, however, to draw the attention of the Council to the following resolution submitted by the Central Division:—

> "That the present practice of veterinary surgeons of taking girls as canine nurses, training them, and giving them certificates, is to be deprecated."

A further report was received from Mr. G. T. Matthews, concerning the R.S.P.C.A. Dispensary in an Eastern Counties town, together with correspondence which had appeared in the local Press with regard to the future of the Dispensary.

It appeared to the Committee that this matter did not call for any further action.

Letters were received from the Lancashire and Mid-West and South Wales Divisions with reference to the flat rate fee of 5s. which the R.S.P.C.A. have agreed to pay to members of the profession for first-aid to dogs and cats injured in street accidents.

It was decided to inform the Lancashire Division that the agreement was not intended to disturb existing arrangements regarding the summoning of the practitioner to an accident.

In the case of the Mid-West and South Wales Division, which had enquired what constituted a reasonable distance from the veterinary surgeon's premises, it was agreed to reply that the Society was prepared to take into account exceptional circumstances, and that the Committee felt that the further definition of "reasonable" could be best determined locally, in consultation with the Branch Secretary of the R.S.P.C.A.

Major-General Sir John Moore reported that he and Sir Frederick Hobday had interviewed the Secretary to the Lord Mayor of London, as requested by the Committee, and had received an assurance that their representations would be borne in mind.

A letter addressed to Colonel Simpson by Sir James Douglas, of Folkestone, together with a copy of one he had written to the local Press in support of the centralised system of free treatment and advocating control by a body representative of the veterinary profession and other interested parties over the destruction of small animals, was read.

It was agreed that the Chairman should confer with Colonel Simpson with a view to correcting certain mis-statements in Sir James's letter, and that the correspondence be then referred to the Association's Committee on Euthanasia.

A letter from Mr. H. G. Michie, of Liverpool, on behalf of a number of local practitioners, was read.

It was decided to forward a copy of this letter to the Lancashire Division, with a request for their observations upon it as early as possible.

Two cases were reported which called for the insertion of counter-advertisements in local newspapers in Surrey and Kent respectively.

Newspaper-cuttings relative to the Llandudno Congress were laid before the Committee. It is gratifying to report that the activities of the Press Association in this connection have resulted in widespread publicity for the proceedings of the Congress.

Sir John Moore seconded the motion for the reception of the report. In discussion, Major H. Kirk said that he did not know if it were intended to consider the resolution emanating from the Central Division, deprecating the practice of veterinary surgeons of taking girls as canine nurses, training them, and giving them certificates. He should like to say, however, that he saw no reason why a veterinary surgeon should not take a girl for six months or so and, having given her a course of training as a canine nurse, should not give her a certificate to say that she had been with him and had, if such were the case, satisfactorily acquitted herself during such a course of training.

He would suggest that, if the resolution were to be amended at all, the amendment should concern itself with the type of certificate that was issued: it was a question of framing the wording of the certificate.

Mr. J. W. McIntosh observed that while there was perhaps a good deal to be said for what Major Kirk had stated, he thought there was an element of danger in the training of canine nurses and the granting of certificates by veterinary surgeons. As they knew, many canine

nurses posed as having been veterinary trained and set up establishments in the neighbourhood of London. His own view was that no certificate should be granted to people who might set up in that way.

Replying to Lieut.-Colonel P. J. Simpson, who asked how a certificate could be distinguished from a reference, Major Kirk said that there was no essential difference, but if a girl had proved satisfactory while under training with a veterinary surgeon, she was surely entitled to "something to show for it." It was far better that these girls should have their training under a qualified man than under a "quack." It was his own practice to write a note to the effect that she had carried on her work satisfactorily. They could call it a certificate if they liked, but in reality it was a reference.

Professor G. H. Wooldridge expressed strong dislike to the word "certificate" in this connection. One could give a girl a testimonial stating that she had been with one a certain time and proved satisfactory, but to give a certificate was to give something more official.

Proceeding, Professor Wooldridge said that it seemed to him there might be a little difficulty in interpreting the wording of that resolution. How far were they prepared to carry their deprecation of the various items mentioned in it? For his part, deprecation was limited to the giving of any form of certificate.

The President: "As it stands here, it deprecates the whole thing."

Professor Wooldridge moved "That this resolution be referred back to the Organising Committee for consideration."

Mr. McIntosh seconded.

Mr. W. Tweed enquired if that was not a matter for the Royal College of Veterinary Surgeons.

The Hon. Secretary observed that it might "clear the air" if he said that the intention of the Committee was merely to draw the attention of the Council to that resolution. The Committee had not considered it in any way. If it was the Council's wish that they should take it back and put it in some other form, they would be quite willing to do that.

The report was then adopted.

Appointments Committee.

The following report of this Committee was read by the Secretary, in the absence of Professor Buxton (Chairman):—

A meeting of the Appointments Committee was held at the Offices of the Association on Monday, October 2nd, 1933, with Professor J. Basil Buxton in the Chair.

The minutes of the previous meeting were read, and signed as correct.

Arising from the minutes, the Chairman reported that the sub-committee appointed at York to deal with the proposed circular letter regarding the Public Health (Meat) Regulations had by correspondence drafted a letter which was at the present time in the hands of the Sub-committee. As soon as he had received it back, the letter would be modified to meet the wishes of the members, and it could then be approved for circulation.

A letter was read from the Treasurer to a City Council, stating that his Council had confirmed the recommendation of its Finance, Estimates, etc., Sub-committee re-affirming that the maximum salary for the post of Veterinary Officer be at the rate of £510 per annum.

Letters from the holder of the appointment were also read.

After discussion, it was decided that a further communication should be addressed to the Corporation, and that the drafting of this letter be left in the hands of the President, the Chairman, and the Hon. Secretary.

The Secretary reported that at the request of Colonel Dixon, a letter had been addressed to the Ripon City Council pressing that a Veterinary Surgeon should be appointed to the Meat Inspectorship, and that as a result of the Association's intervention this appointment had been filled by a member of the profession.

The Council received the report with applause.

Lieut.-Colonel J. A. Dixon said that, in connection with the Ripon question, he should like to express his thanks to the Council and officers of the Association for their intervention in that matter. A member of the profession, who, unfortunately, was not a member of the Association, appealed to him in considerable perturbation in connection with that appointment, which appeared to be going very strongly in favour of a sanitary inspector. He advised him to put the matter before the N.V.M.A., which he (Colonel Dixon) was pleased to do for him, and with that satisfactory result.

In regard to the other local authority appointment, added Colonel Dixon, the important feature was that local authorities passed information as to salaries, etc., on from one locality to the other, and if a low maximum salary were fixed in this case, it would react unfavourably upon the whole of the whole-time men.

The report was adopted, on the proposition of Dr. Wooldridge, seconded by Mr. Tweed.

Veterinary Officers' and Public Health Committee.

The following report was read by Mr. G. P. Male (Chairman) and adopted, without discussion, on the proposition of Mr. McIntosh, seconded by Lieut.-Colonel Dixon:—

Two meetings of the Veterinary Officers' and Public Health Committee have been held during the past quarter, under the Chairmanship of Mr. G. P. Male.

Arising from the minutes of the meeting held at York, on July 3rd, the Committee have considered the suggestion of the Council that a deputation might be appointed to wait upon the Live Stock Traders' Association, which had written to the Ministry of Agriculture criticising the manner in which Veterinary Officers of Local Authorities perform their duties in connection with scheduled diseases.

Having now heard the views of the Chairman and other members, the Committee wish to recommend that no further steps be taken in the matter.

Consideration has been given to a letter from Norfolk part-time Veterinary Officers, drawing attention to variations in the fees paid by County Councils for the routine inspection of dairy cattle, and suggesting, with a view to bringing about some measure of uniformity, that the Association should draw up a scale of fees for this work for the guidance of part-time Officers and Local Authorities.

The Committee have obtained information on this matter from whole-time and part-time Officers, which shows the great difficulty in making really comparable estimates of cost, owing to the great variation of local conditions and methods of payment.

The Committee finds that the fees vary from 6d. per cow per inspection, including the whole of the expenses under the Tuberculosis Order, the Milk and Dairies Acts and Orders, and travelling expenses, to 1s. per cow per inspection exclusive of work done under the Tuberculosis Order.

From the evidence the Committee had before them it was found that the cheapest rate was 6d.—in the case of a County carrying out the work with part-time Officers.

The Committee also found that in some Counties inspections were made twice, and in others four times per year.

The following resolution, submitted by the Public Health Section of the Llandudno Congress, was considered:—

> "The Public Health Section of the Congress of the N.V.M.A. is of opinion that, in in the interests of the Public, it is essential that the Public Health (Meat) Regulations should be so amended as to ensure that all meat exposed for sale in butchers' shops and stalls should be protected from contamination by the maintaining of closed windows to such shops and stalls."

After discussion, it was decided to defer further consideration until the Secretary could obtain additional information regarding the intention of the proposers of the resolution.

Parliamentary Committee.

Mr. J. C. Coleman (Chairman) read the following report of this Committee, and moved its reception:—

The Parliamentary Committee met at 2, Verulam Buildings, on Monday, October 2nd, 1933, with Captain J. C. Coleman in the Chair.

The minutes of the previous meeting were read and signed as correct.

Arising from the minutes, consideration was given to the resolution with regard to the Committee's recommendation in connection with the Report of the Reorganisation Commission for Milk, passed at the Meeting of the Council of the Association held at Llandudno on September 20th.

It was decided to refer the aforesaid resolution to the new Parliamentary Committee, with a recommendation that an early meeting be called to consider the matter.

A letter was read from Lieut.-Colonel T. C. R. Moore, regretting that it was not now possible to give effect to the Association's request that specific mention of the "Veterinary Officer" be made in the Slaughter of Animals Bill, since this Bill had passed through all its stages in Parliament.

After discussion, it was decided to draw the attention of the Ministry of Health to this omission and to invite them to point out to Local Authorities the desirability of affording the same privileges to their Veterinary Officer as are afforded to the Medical Officer of Health in regard to right of entry to slaughter-houses and knackers' yards.

A communication was received from the Ministry of Agriculture in reply to the Association's representation requesting that it be consulted with a view to the appointment of a representative or representatives of the profession on the Panel of Referees under Sub-section 5 (2) of the Improvement of Livestock (Licensing of Bulls) Act, 1931, stating that the Association's request would be fully considered when the question of appointing the Panel of Referees for England and Wales arises.

Mr. W. Tweed asked if it was proposed that local authorities should be circularised asking them to afford the same power to the Veterinary Officer to enter slaughterhouses as was possessed by the Medical Officer of Health and the Sanitary Inspector.

Major D. S. Rabagliati said that the Slaughter of Animals Act gave the authority, and it was not much use sending a letter to local authorities if they had no authority to confer this power on the Veterinary Officer. He had it under the Scottish Act, and the position in regard to this country was most unfortunate.

Professor G. H. Wooldridge commented that the only solution of the problem—and one which in itself was unsatisfactory—was that the Veterinary Officer would have to be appointed a Sanitary Inspector for the purposes of the Act.

Mr. Tweed thought that it was most degrading for a Veterinary Officer to be appointed a Sanitary Inspector, and he hoped that the profession's policy, whatever it were, would not be in that direction.

The President: "As the Bill has passed, I fear we cannot do very much now."

Mr. J. C. Coleman, replying to Mr. Hughes, said that nothing had been done in the way of forwarding to the Ministry of Health and the County Councils' Association the first part of the resolution in connection with the Report of the Reorganisation Commission for Milk. The Committee were waiting for the resolution to be completed, before forwarding.

Mr. McIntosh thought it was a little unfortunate that that matter had not been pressed on a little more rapidly. A great deal of time had been spent on it already, and the question was a very important one both for whole- and part-time men and the general practitioner, and he thought its urgency was great. Unless they were able to do something quickly they would have no voice in that important question.

Mr. Coleman asked, in view of what the Llandudno Conference decided, would it be in order for the Parliamentary Committee to have

plenary powers in regard to that important subject? Then, after altering the second part of the resolution, they could deal with the matter at once.

Mr. Hughes suggested that the first part of the resolution was complete in itself; accordingly, he would like to move: "That the necessary action be taken on the first part of the resolution, as approved at Llandudno."

Mr. Tweed seconded.

Mr. Steele Bodger said it was surely not possible to send the resolution up piecemeal: would it not be better if the new Parliamentary Committee were to consider the matter in its entirety?

Mr. Coleman observed that he looked upon the last part of the resolution, as he thought they all did, as most important; and as the Llandudno meeting did not disapprove of it (they merely asked that it should be reconsidered), he hoped the whole resolution—after further consideration of the second part, if need be—would go forward. It would rather cut the sting out of the whole thing if they sent it in two parts. He would move: "That the new Parliamentary Committee be given plenary powers to act with regard to the resolution."

Mr. Steele Bodger seconded.

Dr. Wooldridge moved "That a special meeting of Council be called to consider the recommendations of the Parliamentary Committee."

This was seconded by Major Rabagliati and agreed, the movers and seconders of other amendments having withdrawn.

[It was subsequently agreed that the present meeting of Council be adjourned to October 11th to consider a report of a subsequent meeting of the Parliamentary Committee, called to consider the resolution.]

The motion for the adoption of the report was then put and carried.

Finance and General Purposes Committee.

Lieut.-Colonel P. J. Simpson (Chairman) read the following report and moved its reception:—

A meeting of the Finance and General Purposes Committee was held at the Offices of the Association, on July 25th, with Lieut.-Colonel P. J. Simpson in the Chair, but apart from purely routine business, the following were the only matters discussed:—

(1) Letters from a number of Divisions on the question of fees for distemper immunisation. Consideration of these has been deferred.

(2) The outline of an attractive scheme of motor-car insurance for the benefit of members of the Association put forward by a firm of Insurance Brokers, now under consideration by a sub-committee.

The Hon. Treasurer will report separately on the finances of the Association for the past three months.

The Hon. Treasurer (Captain W. G. Wragg) made the statement to which the last paragraph of the report refers, his figures reflecting a satisfactory financial position.

The report and the Hon. Treasurer's statement were adopted, on the proposition of Mr. McIntosh, seconded by Mr. R. B. Nelder.

Editorial Committee.

The Chairman of this Committee (Sir John Moore) read its report, as follows:—

During the past quarter the Editorial Committee completed its work in connection with the Congress papers and the publication of the Association's Handbook.

It has been arranged to issue on October 14th an enlarged number of the *Record* containing a report of the major portion of the proceedings at Llandudno. This will include the first paper presented, with discussion, the remainder being dealt with in succeeding issues.

The Committee are indebted to Lieut.-Colonel J. A. Dixon, of Leeds, for an interesting account of the proceedings of the Veterinary Hygiene Section of the Royal Sanitary Institute Congress.

Arrangements have been made for the securing of articles on the work of the Veterinary Services in the Colonies, and a commencement has been made with the publication of this interesting series.

In regard to display advertisements, there has been some restriction of business such as is customarily met with during the holiday months, but the Committee are glad to report that the number of announcements is likely to be satisfactorily maintained to the end of the year. The Congress Handbook again proved an attractive advertising medium to firms exhibiting at Llandudno.

The report was adopted, on the proposition of Sir John Moore, seconded by Mr. McIntosh.

This concluded the receipt of reports of the Association's Standing Committees.

British National Committee of the International Veterinary Congress

The following report was read, on behalf of the British National Committee of the International Veterinary Congress, by Lieut.-Colonel P. J. Simpson, who is Hon. Secretary to the Committee:—

There have been three meetings of the British National Committee of the International Veterinary Congress.

Professor J. B. Buxton has been appointed Chairman of the Committee, and Lieut.-Colonel P. J. Simpson, Hon. Secretary.

Consideration has been given to the preliminary programme for the Congress, and at the invitation of the Committee the following have agreed to be nominated as reporters:—

Dr. F. C. Minett, on Mastitis.
Professor J. B. Buxton, on Tuberculosis.
Dr. W. H. Andrews, on Foot-and-Mouth Disease.
Professor Sir Frederick Hobday, on Recent Progress in Veterinary Surgery.
Captain T. M. Doyle, on Fowl Plague.
Mr. H. E. Hornby, on The Piroplasmoses.
Lieut.-Colonel T. Dunlop Young, on Unification of the methods of Meat Inspection.
Professor R. G. Linton, on Scientific Principles of Feeding.

These nominations have been accepted by the Permanent Commission of the International

Veterinary Congress, and forwarded to the Organising Committee in America for final approval.

Applications for the appointment of official travel agents have been received from the White Star Line, Pickfords Travel Service, and the American Express Company, Inc. The Chairman of the Committee, Dr. W. H. Andrews, and the Hon. Secretary have been appointed to enquire further into this matter and report to the next meeting of the Committee.

The Committee are in agreement that efforts should be made to assist Reporters in attending the International Congress. With this end in view, they recommend that a fund be opened by the Council of the N.V.M.A., to which Divisions of the Association, individual members of the profession and other bodies should be invited to subscribe.

The adoption of the report was moved by Mr. Nelder and seconded by Major F. J. Taylor.

In reply to Professor Wooldridge, Lieut.-Colonel Simpson said that the date of the Congress was from August 13th-18th, 1934.

As the President was about to put the motion, Lieut.-Colonel Simpson added that he hoped, in adopting that report, members of Council would give consideration to the recommendation contained therein and would help the Committee as much as possible in raising that fund.

Mr. Male enquired if there were any funds in the hands of that body to pay the expenses of Reporters.

Lieut.-Colonel Simpson replied that he was afraid there were no special funds of that Association for that purpose, but it was quite possible for that Council to grant a certain amount of money from the general fund for it, as the object would be the furtherance of veterinary science. He thought, if that report were adopted, that the matter of the amount to be given could be referred to the Finance Committee.

The British National Committee was also hoping that that Association would nominate a member to go over as a delegate and would pay his reasonable expenses, and perhaps give a three-figure cheque towards helping with these other people.

Professor Jas. Macqueen asked if it were not inadvisable, at that moment, to venture upon any action in regard to the expenses of the Reporters. They did not know sufficient about what was likely to happen. Public and other bodies might be represented by some of those Reporters, who would have their expenses paid by the body concerned, and unless that Association proposed to send a representative of its own, he proposed that they should exercise a certain amount of discretion in that matter.

Lieut.-Colonel Simpson replied there were some Reporters whose expenses would be contributed to by various bodies, but there were others who would not be in that happy position. They were only asking the N.V.M.A. to raise a fund: the question of the amount would be left entirely in their hands, of course.

The President: "The motion before the meeting is not to make any grant, but to adopt the report."

The motion was carried.

Nominations Committee

The following report of the Committee appointed to make nominations for Standing Committees for the year 1933-34 was read by the Secretary, as follows:—

A meeting of the Nominations Committee appointed by the Council on September 22nd, met at the Offices of the Association on Tuesday, October 3rd, 1933.

The President occupied the chair, and there were also present Colonel J. A. Dixon, Messrs. E. P. Edwards, J. Holroyd, Sir John Moore, Major R. H. H. Over, Major D. S. Rabagliati, Messrs. H. W. Steele Bodger, W. Tweed and W. Woods, together with the Hon. Secretary (Captain J. R. Rider) and the Hon. Treasurer (Captain W. G. Wragg).

The Committee considered the question of the appointment of Standing Committees for the year 1933-34, due regard being paid to the feeling expressed at Llandudno that the Committees should be fully representative of all sections of the profession.

It was resolved to recommend:—

That the Committees should consist of the following members so far as they are willing to serve:—

APPOINTMENTS

Barker, J. R.	Over, R. H. H.
Buxton, J. B.	Procter, J. W.
Dawes, H. W.	Rabagliati, D. S.
Dixon, J. A.	Simpson, P. J.
Lloyd, E. C.	Whitehouse, A. W.
McIntosh, J. W.	Wooldridge, W. R.
Matthews, G. T.	Young, T. D.
Moore, Sir John.	

FINANCE AND GENERAL PURPOSES

Bell, H.	McIntosh, J. W.
Cockburn, H. S.	Macqueen, J.
Dawes, H. W.	Moore, Sir John.
Dunkin, G. W.	Simpson, P. J.
Hobday, Sir Frederick.	Steele Bodger, H. W.
Hughes, L.	Willett, R. A.
Hughes, H. Tudor.	Wooldridge, G. H.
Kirk, H.	

VETERINARY OFFICERS' AND PUBLIC HEALTH

Coleman, J. C.	Rabagliati, D. S.
Dixon, J. A.	Standley, H. P., senr.
Gunning, O. V.	Steele Bodger, H. W.
Lloyd, E. C.	Townson, W. K.
Male, G. P.	Wilkinson, T.
Motton, S. J.	Woods, W.
Over, R. H. H.	Wooldridge, G. H.
Pillers, A. W. Noel.	

ORGANISING

Dawes, H. W.	Nelder, R. B.
Griffiths, H. W.	Over, R. H. H.
Hobday, Sir Frederick.	Pillers, A. W. Noel.
Kirk, H.	Procter, J. W.
Male, G. P.	Ritchie, J. N.
Matthews, G. T.	Simpson, P. J.
McIntosh, J. W.	Standley, H. P., senr.
Moore, Sir John.	

PARLIAMENTARY

Coleman, J. C.	Simpson, R.
Dixon, J. A.	Spreull, A.
Golledge, S. V.	Steele Bodger, H. W.
Male, G. P.	Townson, W. K.
Moore, Sir John.	Tweed, W.
Nelder, R. B.	Wilkinson, T.
Ritchie, J. N.	Woods, W.
Simpson, P. J.	

EDITORIAL

Bevan, Ll. E. W.	Moore, Sir John.
Dunkin, G. W.	Pool, W. A.
Edwards, J. T.	Simpson, P. J.
Kirk, H.	Stableforth, A. W.
Lovell, R.	Wooldridge, G. H.
McIntosh, J. W.	Wooldridge, W. R.
Macqueen, J.	Wright, J. G.
McCunn, J.	

During the course of discussion, the following alterations were made in the foregoing lists, in consequence of withdrawals:—

Appointments Committee.—Major F. J. Taylor, in place of Lieut.-Colonel P. J. Simpson.

Organising Committee.—Mr. J. R. Hewer, in place of Mr. J. W. McIntosh.

Parliamentary Committee.—Captain L. S. Balls, in place of Lieut.-Colonel P. J. Simpson.

Editorial Committee.—Mr. W. Tweed, in place of Lieut.-Colonel P. J. Simpson.

In reference to the constitution of the Veterinary Officers' and Public Health Committee, Mr. Male said that there were missing from the list of nominees some names of members who had served on that Committee for a number of years and who had been of great help to it.

The President observed that, in its selection of nominees, the Committee was guided largely by the number of attendances put in by the members in the past.

Mr. Male replied that, as the Chairman of the Veterinary Officers' and Public Health Committee, he could say that the members of the Selection Committee could not be in the same position to know the amount of work that had been done by the various members, quite apart from attendance. It had been an invariable rule of the Association, hitherto, that the Chairmen of Committees were called in to help in the selection of committeemen, and he thought the present procedure an unfortunate departure. It was true that some of the members of the Committee, owing to various factors, including that of distance, did not attend very often, yet their membership of the Committee was of great assistance, and one was able to refer to them in cases where their help was required.

The report of the Nominations Committee was received and adopted, subject to the changes above noted in the constitution of the Committees, this carrying with it the election of Standing Committees of Council.

Veterinary Advisory Scheme

The next business before Council was to consider whether a new Committee should be appointed to review the Veterinary Advisory Scheme.

The President said that, for the information of Council, he might say that the last Committee appointed for that purpose was mainly composed of members who were also members of the Council of the Royal College of Veterinary Surgeons, and as it had been considered advisable for members of the latter body to sit on that Committee, they had withdrawn.

They might also properly consider whether they wished to have any Committee elected for that purpose.

Captain W. K. Townson thought that it was very necessary indeed that a Committee should be formed to go more fully into the question of the Veterinary Advisory Officers' Scheme, and he proposed that such a Committee be formed.

Mr. E. P. Edwards enquired if the defection of all those who were members of the R.C.V.S. Council was essential. If such members refrained, in certain eventualities, from sitting on the Registration Committee of the Royal College, was there any reason why they should not sit on the Special Committee of the Association to consider that matter?

Mr. McIntosh said that perhaps he ought to explain why this matter was referred back to Council. The Council would doubtless remember that at their meeting in April of this year certain correspondence was laid before them relating to the operations of the Veterinary Advisory Scheme and, after discussion, it was decided to reconstitute a former committee (which dealt with this matter) to go into the whole question again.

As Chairman of that committee, he instructed the Secretary to collect all the information he could bearing upon the question and as soon as that was complete to call the committee together to consider the same and to recommend what action, if any, should be taken.

The committee met and, after hearing some of the evidence which was placed at their disposal, it was thought advisable that those of them who were members of the Council of the Royal College of Veterinary Surgeons should dissociate themselves from an enquiry which might possibly require their attention in another

quarter. As the personnel of the N.V.M.A. Council's committee was largely made up of members of that body, after consultation with the President he deemed it wise to suspend further action and refer back to Council for reconsideration.

Mr. E. P. Edwards expressed the view that it was very desirable that the committee of enquiry, if it was decided to form one, should be a strong one, and he would plead for the presence on that committee of members who were also members of the Council of the R.C.V.S., if it were at all possible for them to serve, consistently with the performance of their duty to the latter body.

As had been suggested, if all those members refrained from sitting on the Registration Committee, they would then be eligible to serve on that Special Committee of the Association.

Mr. McIntosh observed that he thought it desirable that a fresh committee should be appointed, and that members of the Council of the Royal College of Veterinary Surgeons should keep themselves entirely free from an enquiry which might involve a decision in higher places. (Hear, hear.) They all knew how very important were the duties attaching to the Registration Committee of the R.C.V.S. and it was well that the strength of that body should not be jeopardised by one single vote. He was quite satisfied, from information to hand, that the operations of the Veterinary Advisory Scheme required further consideration. It had already made very serious encroachments upon the work which properly belonged to general practice and, indeed, the tendency seemed to be to extend those activities still further.

Members had a right to look to that body for some measure of protection, and unless those officers engaged under the scheme were restricted in their operations, and their duties clearly and definitely defined and observed, he was afraid there would be serious trouble and the interests of all would suffer.

Captain Townson's resolution that a new committee be formed was seconded by Major Kirk and carried.

Council proceeded to elect the new committee, on the proposition of the President, seconded by Captain Coleman, as follows: Captain J. R. Barker, Mr. H. W. Steele Bodger, Captain H. W. Dawes, Mr. E. P. Edwards, Captain J. R. Hewer, Mr. H. V. Hughes, Mr. Tudor Hughes, Major R. H. H. Over, Major F. J. Taylor and Dr. W. R. Wooldridge.

Motion by Mr. Tweed

Mr. W. Tweed moved the following resolution standing in his name on the agenda paper:—

> "That the N.V.M.A. consider the advisability of obtaining the permission of the British Broadcasting Corporation to appoint veterinary surgeons to speak on veterinary matters of public interest."

Speaking to his motion, Mr. Tweed said that, at the Council Meeting at York, he proposed that the N.V.M.A. might consider the possibility of obtaining the permission of the British Broadcasting Corporation to appoint veterinary surgeons to speak on veterinary matters of public interest, and that proposition had been deferred to that Council meeting.

The reason for that motion was the fact that other professions and trade interests had in the past given series of lectures and talks on the wireless, and he felt that the veterinary profession would derive some benefit if they also considered giving a series of lectures on veterinary matters, animal health and disease, which might be written up, for instance, by the Editorial Committee, if that motion were referred to them. They could enlist the literary abilities of Sir John Moore and others on that committee, and those lectures might be drawn up and a person appointed to deliver, on the wireless, the material prepared for him.

He would like that motion to be carried, because they, as a profession, suffered a great deal from being out of the public eye. He did not suggest that in these lectures they should beg for work for the veterinary profession, but that in them the position of the profession should be put before the public. It was for that reason that he proposed that motion.

The motion was seconded by Mr. R. A. Willett.

The President commented that the practice was already in operation in Scotland, where it happened quite frequently that members of the profession spoke over the wireless. In his view, however, if the N.V.M.A. took up that matter, the material it was proposed to broadcast would have to be submitted to the Association for approval.

Mr. Male thought that the utmost care should be exercised in the selection of matter for broadcast lectures, otherwise more harm than good might be done. It was a proposal that required very careful consideration.

The President now put the motion, which was carried, with the addition that it be referred to the Organising Committee for consideration.

Resolutions

(i) *From the Scottish Society of Veterinary Inspectors*:

"That the N.V.M.A. be asked to ascertain the salaries presently paid by local authorities to whole-time veterinary inspectors in Scotland, and, in such cases as the Council of the N.V.M.A. consider the salary paid to be insufficient, to point out to the responsible local authority what an adequate salary for such an appointment

should be, and to urge such local authority to increase the scale of salary accordingly."

The President: "What are your instructions, gentlemen?"

Mr. Steele Bodger: "I move that this be referred to the Appointments Committee."

The proposition was seconded by Lieut.-Colonel Simpson and carried unanimously.

(ii) *From the Veterinary Medicine and Surgery Section of the Llandudno Congress*:

"That a committee of the National Veterinary Medical Association be formed at the earliest possible moment to foster a knowledge of parasitic diseases, and to act as an advisory committee to the National Veterinary Medical Association on questions of policy."

Professor Macqueen asked that the Council should be given more information on that resolution. Was it a question of policy in connection with parasites or of policy in connection with the Association?

Mr. J. O. Powley replied that he would not like to try to explain that resolution, but he thought that what was at the back of the mind of Captain Pillers, in moving it at Llandudno, was that the veterinary profession wanted nudging on the question of parasites: also, that they were lacking in knowledge of the subject. In the latter connection, Captain Pillers had made reference to the fact that little of the literature on the subject had been contributed by veterinarians. His whole plea was that members of the profession should take a larger interest in the subject of parasitology and parasitic diseases.

There being no further discussion, a proposition by Captain Powley, seconded by Mr. Matthews, "That no action be taken" was carried *nem. con.*

(iii) *From the Veterinary Medicine and Surgery Section of the Llandudno Congress*:

"That a committee of the National Veterinary Medical Association be formed at the earliest possible moment to foster a knowledge of poultry diseases, and to act as an advisory committee to the National Veterinary Medical Association on questions of policy."

A proposition "That no action be taken," made by Captain Coleman and seconded by Major A. C. Duncan, was carried without discussion, other than the observation by the seconder that the resolution, in his opinion, did not come within the province of the Association: it was a matter for the College and the Research Institutes.

(iv) *From the Experimental Pathology Section of the Llandudno Congress*:

"That the Council of the Association be requested to appoint a committee to investigate the question of the diagnosis of swine fever."

In connection with this resolution, the Secretary said that, at the Annual General Meeting at Llandudno, Professor Wooldridge asked whether that resolution was seconded at the meeting of the Section devoted to the consideration of the subject of swine fever, and the Chairman (Mr. McAllan) had replied that he had done so. Since that meeting, however, several members had spoken to him (the Secretary) and said that they had no knowledge of the resolution having been put to the meeting.

Mr. McIntosh moved "That no action be taken."

In seconding, Captain Townson said that, with reference to that item, he should certainly support Mr. McIntosh that no action whatever be taken. The Regulations and diagnosis of swine fever were in capable hands, being ably dealt with by the Ministry of Agriculture's staff and officials, and any interference with regard to the methods of diagnosis of that disease by the N.V.M.A. was neither necessary nor desirable.

The motion was carried unanimously.

ANY OTHER BUSINESS

Notice of Motion by Mr. Coleman.—Mr. Coleman gave notice that, at the next meeting of Council, he would move: "That all members journeying a distance of over 100 miles shall receive their return railway fare when attending meetings of the N.V.M.A."

Sir Weldon Dalrymple-Champney's Proposal.—Lieut.-Colonel Simpson now rose to say that all who were present at Llandudno would remember that Sir Weldon Dalrymple-Champneys, at the Annual Dinner, in proposing the toast of the N.V.M.A., said that he hoped to do something for the Association in future. He (the speaker) knew at the time to what Sir Weldon was referring, but he did not like to enlarge upon it on that occasion. He had since had a long talk with Sir Weldon, and the latter was most anxious to do something which should mark his appreciation of the cordial relationship existing between the Association and himself, as representing the Ministry of Health. His idea was to give a medal to the individual—a member of a Division of the National—who had done the best work of the year (that work to be recorded in the Association's journal), more particularly with regard to public health.

A proposition of that kind needed a good deal of consideration as to detail, and he (Colonel Simpson) suggested that they, as a Council, should gratefully accept Sir Weldon's offer, and that the General Purposes Committee should be asked to draw up a provisional set of rules for the suggested prize, and refer them back to Council for their approval or otherwise.

He could assure them that Sir Weldon had put his proposition forward out of the kindness

of his heart and as a tangible expression of the enjoyment he had had at the last two Congresses of the Association. (Applause.)

The President: "I think that this is a very gracious act on the part of Sir Weldon Dalrymple-Champneys and that we should thank him and accept Colonel Simpson's suggestion that it be referred to the General Purposes Committee for consideration. (Hear, hear.)

Lieut.-Colonel Simpson said that he thought it should come officially from the Council that they would be pleased to accept Sir Weldon's offer, and that he be informed that, in collaboration with him, the General Purposes Committee would consider the proposal in detail.

Mr. McIntosh thought that the Council should express their deep appreciation of the interest Sir Weldon had taken in the Association as a body, and of his great kindness in suggesting that prize. His action showed that he was very deeply interested in the profession and the Association and it should encourage work of a special character—more particularly, he understood, public health work—which would be a good thing. (Hear, hear.)

Sir John Moore desired to be associated with those expressions of gratitude. He knew Sir Weldon and Lady Dalrymple-Champneys very well, and he thought it would be a very gracious act on the part of that Association if they made Sir Weldon an honorary member of the Association. He thought they had provision for that.

The President said he was sure that they appreciated that generous act on the part of Sir Weldon and that they would agree that the thanks of the Council should be transmitted to him for that special prize and, later, invite him to a meeting of the General Purposes Committee.

Lieut.-Colonel Simpson moved: "That this Council accept with many thanks the kind offer of Sir Weldon Dalrymple-Champneys and refer the matter of drawing up the details of the prize and the rules regulating it to the General Purposes Committee, and that they be asked to collaborate with Sir Weldon in that regard."

The resolution was seconded by Mr. Steele Bodger and carried with acclamation.

In view of the proposal of the Parliamentary Committee that the resolution of the Council on the committee's recommendation on the report of the Reorganisation Commission for Milk be dealt with by the new Parliamentary Committee to be appointed at this meeting, it was agreed that the meeting of Council be adjourned to October 11th, when it was understood that the new Parliamentary Committee would be in a position to report upon this matter.

Prior to the adjournment, Lieut.-Colonel Simpson proposed that the Council accord a hearty vote of thanks to the Association's new President for his conduct of the proceedings. Council concurred with enthusiasm.

ADJOURNED MEETING OF COUNCIL

At the adjourned meeting of Council, held at the Conway Hall, Red Lion Square, W.C.1, on the afternoon of Wednesday, October 11th, 1933, the chair was occupied by the Past-President (Lieut.-Colonel P. J. Simpson), in the absence of the President (Mr. W. Nairn).

The following members of Council were also present: Mr. L. S. Balls, Captain J. R. Barker, Messrs. H. Bell and H. W. Steele Bodger, Captain R. E. C. Bullen, Captain J. C. Coleman, Lieut.-Colonel J. A. Dixon, Captain J. R. Hewer, Sir Frederick Hobday, Messrs. H. V. Hughes, L. Hughes, E. C. Lloyd, J. W. McIntosh, G. P. Male, G. T. Matthews and C. E. Perry, Captain A. W. Noel Pillers, Captain R. Simpson, Mr. H. P. Standley, senr., Captain W. K. Townson, Mr. T. Wilson, Dr. W. R. Wooldridge and Captain W. G. Wragg.

Apologies for their inability to attend the adjourned meeting were received from Dr. O. Charnock Bradley, Captain H. S. Cockburn, Mr. Duncan Cumming, Mr. P. F. Dolan, Major T. Dalling, Major A. C. Duncan, Mr. E. P. Edwards, Professor S. H. Gaiger, Mr. Arthur Gofton, Captain H. Tudor Hughes, Professor J. Macqueen, Mr. W. C. Miller, Major-General Sir John Moore, Captain S. J. Motton, Mr. R. B. Nelder, the Hon. Secretary (Captain J. R. Rider), Major D. S. Rabagliati, Mr. J. N. Ritchie, Mr. W. Tweed, Dr. A. W. Whitehouse, Mr. Wm. Woods and Professor G. H. Wooldridge.

At the outset of the proceedings, the Secretary said that that was an adjourned meeting of Council to receive a report of the Parliamentary Committee with regard to the recommendations of the Reorganisation Commission for Milk; also to deal with any other matters requiring immediate attention.

Unfortunately the President, Mr. Nairn, was unable to attend, but he understood that he had been in touch with Colonel Simpson, and that the latter would be willing to take the chair if it was the wish of the meeting.

Captain J. C. Coleman proposed accordingly, Mr. C. E. Perry seconded, and the proposition was carried unanimously.

Lieut.-Colonel Simpson now took the chair, and, having thanked the members, said that, as that was an adjourned meeting of Council, there were no minutes to be brought forward. As the Secretary had told them, they adjourned to receive the further report of the Parliamentary Committee with regard to the recommendations contained in the report of the Reorganisation Commission for Milk; also to deal with any other urgent matters. He would ask Colonel Dixon, the Chairman of the Parliamentary Committee, to read the report of a meeting of that committee held that morning.

Report of the Parliamentary Committee

The following report was read by Lieut.-Colonel J. A. Dixon (Chairman), who moved its reception:—

A meeting of the Parliamentary Committee was held at the Offices of the Association, on Wednesday morning, October 11th, 1933, when there were present: Mr. L. S. Balls, Mr. H. W. Steele Bodger, Captain J. C. Coleman, Lieut.-Colonel J. A. Dixon, Mr. S. V. Golledge, Mr. G. P. Male, Captain R. Simpson, Captain W. K. Townson, and the Hon. Treasurer (Captain W. G. Wragg).

Lieut.-Colonel J. A. Dixon was appointed Chairman of the Committee for the ensuing year.

The minutes of the previous meeting were read, confirmed and signed.

Arising from the Minutes it was affirmed that a letter be sent to the Ministry of Health pointing out the unsatisfactory position in which Veterinary Surgeons are placed under the Slaughter of Animals Act, 1933, and urging the desirability of the Veterinary Officer being specifically mentioned in this Act as well as in the Public Health Act, 1875.

The drafting of this representation was left in the hands of the Chairman and the General Secretary.

On the instructions of Council, the Committee gave renewed consideration to its Resolution on the subject of the Report of the Reorganisation Commission for Milk, and desires to submit the following revised recommendation:—

> "That a communication be addressed to the Minister of Health, the Minister of Agriculture, the County Councils Association, and the Economic Advisory Council to the following effect:—
>
> > "The Council of the National Veterinary Medical Association of Great Britain and Ireland have given consideration to the Report of the Reorganisation Commission for Milk, and especially its recommendations with regard to the routine inspection of dairy cattle, and that having regard to the great importance of the recommendations and the need for their early application, the Council earnestly recommend that full advantage should be taken of the services which could be rendered by veterinary practitioners in the carrying out of the proposals, as well as those of whole-time veterinary officers; the Council consider the services of veterinary practitioners to be essential to the successful operation of any scheme for the control and eradication of animal diseases.
> >
> > "The Council would further recommend that the Government be pressed to amend the existing legislation so as to secure uniformity of action in regard to routine inspection of dairy cattle and generally in the direction of securing co-ordination of the veterinary control of animal diseases."

The following letter was read from Mr. J. Holroyd, and the Committee decided to refer it to the Council:—

> The General Secretary,
> The N.V.M.A., London, W.C.1.
>
> "Dear Sir,
>
> "In the *Farmer and Stock-Breeder*, of October 2nd, page 2139, I notice an article on the Milk Marketing Scheme, and in the third column, paragraph 5, are the words 'the purchaser will at all times have . . . full power to examine the health of the cows. . . .'
>
> "I do not know if there is any mention of such examination being carried out only by qualified veterinary surgeons; there is no mention of it in the article.
>
> "I think the N.V.M.A. should immediately approach the Milk Board and see to it that in any contracts it must be stipulated that the purchaser must employ qualified veterinary surgeons to enquire into the health of the animals. Possibly you have already done this, but, knowing what happened with the Milk Commission enquiry, I thought I would write and mention it.
>
> "Yours faithfully,
> John Holroyd."
>
> Simmons Street,
> Blackburn.
>
> *October 9th*, 1933.

Captain J. C. Coleman seconded the motion for the reception of the report, which the Chairman then declared open for discussion.

Captain A. W. Noel Pillers expressed the view that the communication to which reference was made in the committee's recommendation should be addressed to the Association of Municipal Corporations, in addition to the other persons and bodies mentioned, and Council accepted the suggestion.

Replying to a member who enquired if the Council were making any recommendation as to how veterinary practitioners should be employed under the Milk Reorganisation Scheme, Lieut.-Colonel Dixon said that that matter had been thoroughly discussed in all its bearings by the Parliamentary Committee and it was felt that it was inadvisable to dictate to anybody the method which should be adopted. The committee were quite prepared, in due course, to submit a scheme for the utilisation of the services of veterinary practitioners under the Milk Reorganisation Scheme, but not at that stage.

Mr. H. P. Standley expressed the fear that delay in dealing with that aspect of the matter would have a very serious effect.

Lieut.-Colonel Dixon pointed out that it was stated in the Memorandum that "the Council earnestly recommend that full advantage should be taken of the services which could be rendered by veterinary practitioners in the carrying out of the proposals, as well as those of whole-time veterinary officers: the Council consider the services of veterinary practitioners to be essential to the successful operation of any scheme for the control and eradication of animal diseases." It was considered that that insertion covered the point as well as it could be covered at the present time.

Captain J. R. Barker expressed the view that the recommendation did not go far enough. He

gathered that there seemed to be a little misapprehension as to whether that Association gave any evidence before the Reorganisation Commission for Milk. If that Association did not, certainly some prominent members of the Association gave evidence, and it seemed strange to come there and find that the gentlemen sitting on the Parliamentary Committee did not know if any members of that Association did so. He thought they ought to know that such evidence was, in fact, given.

Further than that, he thought that whatever was done there (at that meeting) should give some lead to the Divisions—one of which he represented—on what their members were to do, and also what members of that Association who served on public bodies were to advise those bodies to do: he found himself in that position.

He found that the routine inspection of dairy cows four times a year was rather being forced on the veterinary profession to remedy what was possibly an evil: but was that remedy just? If they could not say definitely that they could eliminate tuberculosis from the milk by inspection four times a year, he thought they should say that they could not guarantee it. He felt that if they put it forward from that Association to either the Ministry of Health or the Ministry of Agriculture, or to the public, that they were going to achieve that result, they were making a stick for their own back.

He was glad that co-ordination of veterinary services was in, but he thought they ought to take into consideration where the suggested routine examination was going to lead them. In his view, it would be far better if they had a panel practice for these services, and attended their own clients.

Captain Coleman asked if it would be out of order to enquire of Mr. Barker if he was in a position to give the names of those who gave evidence before the Commission, because it had been a matter of great concern, both to the Royal College and the National, to know whether or not anyone did do so. Neither body had been approached officially.

The Chairman observed that, while he wished to allow as much latitude as he could to speakers, that would not be in order in a discussion on that resolution. The matter before the Council at the moment was to pass, reject, or amend that report, but he thought that would be going beyond the purview of the matter they had to consider.

He personally knew of no member of the Association who gave evidence before the Commission, but he did not think it would be right to let that question go forward in Council.

Captain Coleman said that his reason for asking the question was this: he was the late Chairman of the Parliamentary Committee, and it was the endeavour of that committee to gain as much information as they could to guide them in the action they should take. They were guided by the impression that the Reorganisation Commission for Milk had received no veterinary evidence, and therefore they wanted to remedy that omission, so far as was possible.

The Chairman stated that the reason why the profession were not represented on the Commission was because of the terms of reference of the Commission, in which no mention was made of anything relating to the work of the veterinary surgeon.

Captain Coleman asked if it were not in order to glean what they could of the information the Commission had received from the profession.

The Chairman replied that, if they considered that the Parliamentary Committee had not sufficient evidence in front of them to draw up a satisfactory report, then they could refer the report back.

Captain Coleman: "I am most anxious not to cause any delay."

Mr. McIntosh said that it appeared to him that it did not matter very much to them what evidence had been given before the Commission. Whoever gave it, did so as a private individual. What they wanted now was to send forward the views of the Association as a whole; something which carried with it weight—the weight of the N.V.M.A.

Dr. W. R. Wooldridge suggested that they should pass the resolution as it stood and send it to the necessary quarters, and that they should then ask the Parliamentary Committee to draw up a scheme for the Association's policy in the immediate future. That could then be sent to the Economic Advisory Council or to any other body that was considering that question. He was not a member of the Parliamentary Committee, but from all the views he had heard, at Llandudno and elsewhere, it seemed to him that the committee had done their work very well in getting that resolution out in its present form.

Mr. Standley expressed the hope that in the clause "the Council earnestly recommend that full advantage should be taken of the services which could be rendered by veterinary practitioners in the carrying out of the proposals, as well as those of whole-time veterinary officers," the words "the veterinary profession" would be substituted for "veterinary practitioners," and the words "as well as those of whole-time veterinary officers" deleted.

Mr. Steele Bodger: "If we do that, we are cutting out the very word ('practitioners') we are endeavouring to emphasise, and also cutting the whole ground from under our feet." (Hear, hear.)

The motion for the adoption of the report, as amended, was now put (Captain Coleman moving

and Captain Simpson seconding), and the motion was carried ***nem. con.***

Replying to Captain Coleman, the Chairman said that it was not possible to co-opt to Council non-members of that body who had been elected to the newly-constituted Parliamentary Committee. They must be elected in the manner laid down in the articles of association.

Dr. W. R. Wooldridge moved "That the joint committee of the Parliamentary Committee and the Veterinary Officers and Public Health Committee be asked to submit a scheme to this Council for adoption as the Association's policy to secure uniformity of action in regard to the routine inspection of dairy cattle and generally in the direction of securing co-ordination of the veterinary control of animal diseases; and, further, that the committee recommend what action, if any, be taken by the Council."

The motion was seconded by Mr. Coleman and carried unanimously, Mr. Male adding the comment that he hoped the joint committee would find it desirable to re-insert the third paragraph of the original resolution submitted by the Parliamentary Committee, but which was not approved by the Annual General Meeting. In it the opinion was expressed that the routine inspection of dairy cattle should be placed under the direction and control of one central Government Department, with an establishment of a Chief Veterinary Officer, Area Veterinary Officers, District Veterinary Officers and a staff of veterinary practitioners, and it was thought by the committee that that was the only scheme which was a workable one.

Council now proceeded to the consideration of Mr. Holroyd's letter.

The Chairman, in reference to the quotation, "the purchaser will at all times have . . . full power to examine the health of the cows," said that the quotation was not *verbatim*: it was not exactly the same as it was in the official form of contract, which he would ask the Secretary to read.

The Secretary read the official form of contract, as follows:—

"The Purchaser and his/their representatives shall at all times have free access to the cow-houses, farms and premises where the milk is or has been produced and full power to examine into the health of the cows and the suitability of the water supply and the sanitary condition of the premises, should the premises, their surroundings, the water supply or the condition or the treatment of the cattle or of milk be such as to render the milk impure or unsafe for human consumption."

The Chairman: "In other words, Mr. Holroyd's suggestion is that the purchaser cannot go and have a look himself, but must send a representative, who must be a veterinary surgeon."

Mr. Male commented that the statement in the contract form appeared to him to be quite a reasonable one: he did not think they could complain about it.

The Chairman observed that Mr. Holroyd wanted to make it compulsory that a practical farmer or dairyman must send a veterinary surgeon. He did not think they could possibly press for that. (Hear, hear.)

Major Dixon said that that matter had been discussed at the meeting of the Parliamentary Committee held that morning, when it was explained that that was merely a clause that had existed for many years in the agreement in any large milk contract. It was fairly obvious that, in practice, the person who would be asked to examine the herd, if such an examination was desired, would be a veterinary surgeon.

It was proposed by Mr. Steele Bodger, seconded by Mr. Male and unanimously agreed, that Mr. Holroyd be thanked for bringing that matter to the notice of the Council and that he be informed that, under the circumstances, the Council considered that no action should be taken.

Reorganisation Commissions for Eggs and Poultry.—The Secretary drew the attention of the Council to the fact that there had recently been appointed two reorganisation commissions for the marketing of eggs and poultry—one for England and Wales and one for Scotland—and that it was proposed to set up a further commission for Great Britain.

The Chairman commented that this was an instance in which he thought they should decide whether they should ask to give evidence before these commissions.

Captain Pillers said that it could not be doubted that the question of poultry diseases would enter into the enquiry. As a matter of fact, the resolution passed at Llandudno, and which the Council already had turned down, had behind it his knowledge of the setting up of such commissions.

On the proposition of Mr. Male, seconded by Colonel Simpson, it was agreed to write to the Secretaries of the commissions, offering to furnish skilled scientific evidence on the subjects before them, with particular regard to the diseases of poultry, and to assist the commissions in any way possible.

Dr. Wooldridge said that, before the meeting closed, he would like to say that it had struck him, since the previous meeting, that the way in which that Council handled the resolutions from the Annual General Meeting was rather discourteous and certainly ill-advised. He thought the least they could have done, as a Council, especially in view of the feeling expressed at Llandudno that the Council was not in touch with the body of the Association, was to have remitted those resolutions to the General Purposes Committee.

He did not know if it would be in order, if

those proceedings were part of the same meeting, to do that now.

The Chairman replied that he was afraid he would have to rule Dr. Wooldridge out of order, just because they were at the same meeting at which those resolutions had been discussed and certain action had been taken. Dr. Wooldridge could, however, give notice of motion to raise the question again at the following meeting of Council.

Dr. Wooldridge said that he gave notice of motion to the effect that those resolutions be reconsidered at the next Council meeting.

The adjourned meeting of Council terminated with an expression of indebtedness to Lieut.-Colonel Simpson for his conduct of the proceedings.

N.V.M.A. Divisional Report

CENTRAL VETERINARY SOCIETY

ANNUAL GENERAL MEETING

The Annual General Meeting of the Central Veterinary Society was held, by courtesy of the Principal (Sir Frederick Hobday), at the Royal Veterinary College, Camden Town, N.W.1, on the evening of Thursday, October 12th, 1933. Although the Society was accorded the use of the Large Lecture Theatre, the attendance was by no means commensurate with the importance of the occasion.

The chair was occupied by the retiring President, Captain R. J. Stow, and there were also present Mr. H. C. P. King (President-elect), Lieut.-Colonel E. P. Argyle, Mr. L. S. Balls, Mr. W. Brown, Captain R. E. C. Bullen, Mr. H. E. Bywater, Lieut.-Colonel H. Greenfield, Messrs. S. L. Hignett, J. W. H. Holmes, H. D. Jones, Herbert King, Major W. Hamilton Kirk, Major Glyn Lloyd, Mr. G. H. Livesey, Professor J. McCunn, Mr. J. W. McIntosh, Dr. F. C. Minett, Mr. W. Perryman, Lieut.-Colonel J. W. Rainey, Dr. A. W. Stableforth, Mr. W. Norman Thompson, Captain W. K. Townson, Mr. J. D. Williams and Mr. R. A. Willett.

The minutes of the last Annual General Meeting, having been published in *The Veterinary Record*, were taken as read and were confirmed and signed.

CORRESPONDENCE

(1) From the Hon. Secretary (Captain J. F. Macdonald), Captain S. J. Motton and Dr. A. L. Sheather apologising for their inability to attend the meeting.

(2) From Major Frank Chambers, of Wolverhampton, and Captain D. Wyllie, of Wembley Park, resigning from membership in consequence of the difficulty they found in attending the meetings of the Society. The resignations of these Fellows were accepted with regret.

(3) A letter from Mr. E. P. Edwards, of Mold, Flintshire, relative to a resolution passed at the last meeting of the Central Veterinary Society in connection with the Veterinary Advisory Officers' scheme.

It was agreed to refer this letter to the Council of the Division for consideration.

Nominations.—The following nominations for Fellowship were made: Mr. J. J. Davies, of 1, Church Street, West Ham (Proposer, the Hon. Treasurer; Seconder, the Hon. Secretary); Mr. J. McLaren Dawson, of The Warren, Warlingham, Surrey (Proposer, Major R. T. Smith; Seconder, Captain P. J. Turner); Mr. F. J. Kinghorn, of Staines (Proposer, Mr. R. A. Willett; Seconder, Mr. F. W. Willett); Mr. G. S. Peyton, of Tunbridge Wells (Proposer, Sir Frederick Hobday; Seconder, the Hon. Secretary).

ANNUAL REPORT

In the absence of the Hon. Secretary, his Annual Report was presented to the meeting by the Hon. Treasurer, and was in the following terms.—

"During the past session the Division has held four Council meetings, the Annual General Meeting, the annual dinner-dance, seven general meetings, a summer meeting and a combined meeting in conjunction with the Royal Counties and the South-Eastern Divisions.

"The attendance at the meetings at last shows a pleasing increase, the average number of Fellows being 34¼, although visitors have decreased to three. This is still capable of considerable improvement, but it is at least encouraging to those responsible for the arrangements made during the session.

"Sixteen new Fellows have been elected, against which we have to record six resignations and two deaths, thus bringing our total membership to over 250.

"The following is a list of papers presented: (1) The Presidential Address, Captain R. J. Stow; (2) 'The Examination of Polo Ponies,' Major R. H. Stalker; (3) 'Some Remarks on the Clinical Aspect of Cysts and Tumours,' Mr. C. Formston; (4) 'Animal Parasites,' Dr. L. E. Robinson; (5) 'Canine and Feline Skin Diseases,' Mr. J. W. H. Holmes; (6) 'Veterinary Practice on behalf of the Fur-bearing Animal and Bird Industries and Fancies,' Dr. Tom Hare.

"In addition to these, discussions took place on the following subjects: (1) Canine Nurses; (2) Difficulties met with in Prosecutions for Alleged Cruelty to Animals—Openers, Captain L. S. Balls and Professor J. McCunn; (3) The Report of the Reorganisation Commission for Milk—Openers, Captain W. K. Townson and Mr. H. E. Bywater.

"In conclusion, our thanks are due to the many Fellows who have brought *post-mortem* specimens during the session, also to the President of the South-Eastern Division for extending to our members a welcome invitation to the summer meeting of that Division.

J. F. Macdonald, *Hon. Secretary.*"

Captain Townson seconded and, there being no discussion, the motion was carried unanimously.

ANNUAL STATEMENT OF ACCOUNTS

The Hon. Treasurer (Dr. J. McCunn), in presenting his statement of accounts for the year 1932-1933, stated that they had terminated the year with a balance in hand of £45 18s. 2d. The number of Fellows paying by bankers' order had increased to 54, which was very convenient for the Treasurer. It was gratifying to be able to record that during the past year most of those in arrear with their subscriptions had paid up.

They would have noticed from the statement before them that they had purchased £50 of Consols, which had been added to the investments of the Society.

The President commented that he thought they must agree that the statement of accounts disclosed a very satisfactory condition of affairs, and he felt that he would like to congratulate the Hon. Treasurer on keeping the accounts of the Society so well, and ending the year with such a good balance. (Applause.)

Captain Townson moved that the statement of accounts be received and adopted. This was seconded by Mr. Herbert King and carried unanimously.

Place and Day of Future Meetings.—The meeting next agreed to take together items Nos. 6 and 9 on the agenda, the first being "To consider a suggestion that future meetings be held on Wednesday instead of Thursday," and the second "To decide upon a suitable place in which to hold meetings." Consideration of the change of place of meeting from the Library of the Royal College was necessitated by the refusal of the Library Committee of that body to continue to sanction the use of the room, in consequence of the increasing weight of books therein.

After considerable discussion it was eventually agreed that further consideration of these two items should be deferred until the December meeting of the Society, these matters to be placed on the agenda, which should include the words "to consider the suitability of the Conway Hall as the meeting place of the Society."

As the meeting was about to proceed to the election of Office-Bearers, the Hon. Treasurer and Mr. Bywater were appointed to act as scrutineers.

Election of Office-Bearers

President.—The retiring President said it gave him very great pleasure to inform the meeting that the Council of the Society had unanimously decided on Mr. H. C. P. King as their President for the coming year. (Loud applause.)

It did not need any words of his to tell them about Mr. King, because they all knew about him themselves. He was sure that in him they would have a very good President and that he would fulfill the duties in an excellent manner.

The meeting received Mr. King with acclamation as he now proceeded to take Captain Stow's place in the Presidential Chair, in leaving which Captain Stow added that he desired to express his very sincere thanks for the support all the Fellows had accorded him during his year of office, and especially to the Secretary and Treasurer; he was sure he had felt "very much out of water" upon the rare occasions when the Secretary had been unable to take his place at his side.

In returning thanks for his election, Mr. King expressed his indebtedness to the Fellows for the signal honour and the mark of confidence they had bestowed upon him in electing him as their President for the ensuing year. When he realised the long line of distinguished Presidents whom he had been called upon to succeed, he felt very diffident in accepting the office, but he would try to carry on as President comforted by the fact that he should have very ready help from the Secretary and others.

Continuing, the President said that he would like to move a very hearty vote of thanks to the retiring President for the very efficient manner in which he had carried out his duties during the past year.

The vote of thanks was carried with acclamation.

Captain Stow, in acknowledgment, thanked the meeting very much for that vote of thanks. Whatever he had done during the year he had done to the best of his ability, which, he was afraid, was not very great. It was only the support he had received from them all that had kept him going. He could assure the new President that he had a very pleasant job—he had enjoyed it right from the very beginning and he only hoped Mr. King would have as good a time as he had had.

Vice-Presidents.—The following were elected: Mr. L. S. Balls, proposed by Captain Townson, seconded by Major Kirk; Sir Frederick Hobday, proposed by Mr. Perryman, seconded by the President; Professor J. G. Wright, proposed by Captain Stow, seconded by Mr. Herbert King.

Council.—The following were elected by ballot: Lieut.-Colonel E. P. Argyle, Captain R. E. C. Bullen, Mr. H. E. Bywater, Mr. H. D. Jones, Major W. Hamilton Kirk, Mr. G. H.

Livesey, Professor James Macqueen, Messrs. J. W. McIntosh, W. Perryman, W. Norman Thompson, R. A. Willett and Professor G. H. Wooldridge.

Hon. Treasurer.—Dr. J. McCunn was re-elected to this office on the proposition of the President.

Hon. Secretary.—Captain J. Macdonald was re-elected on the proposition of Mr. J. W. McIntosh.

Trustees.—Mr. E. L. Stroud, Captain S. Villar and Mr. J. Willett (re-elected).

Auditors.—Colonel P. W. Dayer-Smith and Professor J. G. Wright (auditor representing Council).

ANY OTHER BUSINESS

The President said that under this heading he regretted that he had to make reference to the death, after an illness of some duration, of Major D. R. Chalmers, of Tunbridge Wells. He understood that Major Chalmers had left a wife and two children, and he suggested that they should send a note of sympathy and pay their respect to his memory in the usual manner.

The Fellows complied by standing in silence for a few moments.

Captain Townson said that in connection with the subscription which the Society sent to the National Horse Association, he would like to ask the representatives of the Society to that body whether they could ask the National Horse Association to bring pressure to bear on local authorities to keep the grass at the sides of their roads in better condition. This was about the only place on which it was safe to ride a horse, yet there were great gaps in these grass verges, which were too often littered with wire netting, corrugated iron and other débris, making the side of the road almost more unsafe than the middle in places.

Mr. Perryman replied that he should be very pleased to bring this matter to the notice of the National Horse Association. He was sure that that body would take every step to get the matter remedied, but it would facilitate their action very much if they could be supplied with information concerning specific instances. Many townships had their own bye-laws, under which such matters were satisfactorily dealt with, but in country districts it was not so. The National Horse Association did everything possible for the benefit of the horse and horse owners and users generally, and he would certainly have much pleasure in bringing this matter to their notice at the next meeting.

Captain Townson expressed his thanks.

Mr. Livesey enquired of their representatives on the National Horse Association if the officers of that body ever read the *Evening Standard*—(laughter)—and, if so, were they going to do anything about it?

Mr. McIntosh replied that ten days previously he had written a letter to that paper and he could not get it in. (Laughter.)

The President observed that he believed that representations on this matter (the horse on the London streets) had been made to another daily paper, and he thought that it was possible that some article in opposition to the *Evening Standard* campaign would appear in it. (Hear, hear.)

The meeting terminated with the passing of a hearty vote of thanks to the new President for his conduct of the proceedings.

J. F. Macdonald, *Hon. Secretary.*

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

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DIARY OF EVENTS

Nov. 6th.—Meeting of the Editorial Committee, N.V.M.A., at 2, Verulam Buildings, Gray's Inn, W.C.1, at 4.30 p.m.

Aug. 13th-18th, 1934.—Twelfth International Veterinary Congress, New York.

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PERSONAL

R.C.V.S. Fellowship.—We are glad to note, from the report of the Quarterly Meeting of Council, R.C.V.S., shortly to be published in this journal, that the Fellowship Diploma has been conferred on Mr. H. S. Caldwell, of Newcastle-under-Lyme. The thesis submitted by Mr. Caldwell, who is a frequent contributor to our clinical columns, was entitled "Clinical Observations on Lactation Tetany in North Staffordshire."

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R.C.V.S. Prizes.—The same report contains the information that the First and Second FitzWygram Prizes were awarded respectively to Miss M. Oyler, of London, and Mr. G. A. Durham, of Edinburgh. These prizes are awarded to the two students who, during their respective curricula, shall have obtained the highest and the second highest aggregate of marks in all the professional examinations for the Membership Diploma. The number of marks obtained by Miss Oyler was 693, while Mr. Durham obtained 669.

The Walley Memorial Prize, awarded to the student obtaining the highest number of marks at the written examinations during the year in Pathology, Materia Medica and Hygiene, was secured by Mr. J. K. S. Elmslie, of Edinburgh, with 104 marks.

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Mr. Henry Gray.—In our last issue we recorded, with great regret, the removal to the West London Hospital of Mr. Henry Gray for rest preparatory to the performance of an operation. Despite the fact that, as we are glad to learn, the anticipated improvement in Mr. Gray's condition has taken place, it has been deemed advisable to postpone the operation. We are able to assure the many friends of Mr. Gray numbered among our readers that he is still allowed to receive visitors during the afternoon.

Appointments.—Mr. W. E. Lancaster, M.R.C.V.S., informs us that he has been posted to the Federated Malay States and not, as given in our issue of October 14th, to the Leeward Islands. According to a Colonial Office Appointments List since issued, Mr. L. R. Hutson, B.V.SC., M.R.C.V.S., has been appointed as veterinary surgeon, Leeward Islands.

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Mr. R. J. Roe, M.R.C.V.S., Chief Veterinary Officer, has returned to Cyprus on the expiration of leave.

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Obituary

DEATH OF DR. CALMETTE

We deeply regret to record the death, at the age of 70 years, of Professor Léon Charles Albert Calmette, Assistant Director of the Pasteur Institute, which took place in Paris on Sunday morning last. Dr. Calmette had been ill with influenza for a fortnight and succumbed to an attack of peritonitis which ensued some four days before his end.

In our next issue we shall publish an extended notice of the life and work of Professor Calmette, so great a part of which was devoted to the study of tuberculosis and methods of immunisation.

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The Late Mr. John Taylor, M.R.C.V.S.

In connection with the death of Mr. John Taylor, M.R.C.V.S., of Edinburgh, which we recorded in our last issue, the following tribute was included in an extended notice from the pen of Mr. J. W. H. Benyon, in the October 27th issue of the *Dog World*: "For some time past Mr. Taylor's health was far from good, and, indeed, became so bad that just before the Scottish Kennel Club show, to which he was the official veterinary surgeon, it was considered most unlikely that he would be able to attend. However, such was his pluck and endurance, coupled with a high sense of duty, that he took his accustomed post and carried out his regular duties. The effort was too much, and he had a serious relapse which, to the regret of all who had the honour to know him, ended fatally.

"To know John Taylor was to love him: kindly and generous to a degree, ever ready to give a helping hand to those less fortunate than himself. Everyone had a good word for him. In his chosen profession he has left a blank which will be hard to fill. I know that he was worshipped by his assistants as a conscientious and most painstaking instructor, as well as for his lovable qualities. There are many who are now in a snug practice who have reason to thank John Taylor for their start in life. No dog show in Edinburgh seemed complete without his genial and breezy presence.

"The funeral took place on October 22nd and was attended by over 300 people who came from all parts of Scotland to pay tribute to one whom they so much admired. Many beautiful floral tributes were sent, including wreaths from the Scottish K.C. and the Caledonian C.S."

Amongst those present at the graveside were: Messrs. Esmond Brown, M.R.C.V.S., and J. N. Ritchie, M.R.C.V.S. (President and Secretary respectively of the Scottish Metropolitan Division, N.V.M.A.), Edinburgh; Professors Geo. Weir, M.R.C.V.S., and Wm. Robb, J.P., F.R.C.V.S., from Glasgow; Messrs. Jas. Macfarlane, M.R.C.V.S., Glasgow; Alexander Thomson M.R.C.V.S., Glasgow; A. Larnach, M.R.C.V.S., Musselburgh; Wm. Aitken, M.R.C.V.S. (home from Uganda); Major John Judge, M.R.C.V.S., R.A.V.C., Edinburgh; Mr. H. M. Wilson, M.R.C.V.S., of Cupar, Fife (as a pall-bearer), and several veterinary students.

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Mr. W. Buckley

Mr. Wilfred Buckley, the expert on the dairy industry, particularly in regard to milk, whose home was Moundsmere Manor, Basingstoke, died in a London nursing home on Thursday of last week at the age of 60. Mr. Buckley was one of the pioneers of the clean milk movement from the days before the war. He did perhaps more than any other man to encourage farmers to produce milk of the highest hygienic quality, and it was largely due to his energy and enthusiasm that the Ministry of Health established legal standards for graded milk. Mr. Buckley was one of the keenest supporters of the National Milk Publicity Council and its "Drink More Milk" campaign. "His integrity and devotion to the best interests of the dairy industry were recognised on all sides," says *The Times*.

A farmer of his own land, he took a great interest in agriculture generally, though it was milk that specially occupied his attention. He was a member of the Milk Advisory Committee and of the Tuberculin Committee of the Medical Research Council. To him the National Clean Milk Society owes its foundation, and during the years 1915 to 1928 he was Chairman of that body.

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Mrs. R. J. Hickes

The deepest sympathy will be extended to Mr. R. J. Hickes, J.P., M.R.C.V.S., of Market Weighton, in the death of his wife, which took place on Sunday morning last. Mrs. Hickes had suffered from heart trouble for the greater part of this year, and Mr. Hickes, who is Examiner in Surgery for the R.C.V.S., was called away on the last day of the July examinations, as her condition was then giving rise to anxiety. She rallied shortly afterwards, but never really recovered her strength.

The funeral took place at Market Weighton on Tuesday, when tribute to her memory and in sympathy with Mr. Hickes was paid by a large company.

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FOOT-AND-MOUTH DISEASE PRECAUTIONS

Three hundred unemployed men are affected as the result of the latest development in the foot-and-mouth disease areas in Somerset. The Ministry of Health has ordered the suspension of all operations on the 20 acres of allotment land acquired by the Bristol Unemployed Welfare Association. Cattle from the infected areas had recently grazed there. The precaution prevents the possibility of the men's boots carrying the disease to the allotments.

An outbreak was confirmed on Tuesday night among cattle and pigs on premises at Wirksworth, Derbyshire.

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DAIRY HERD INSPECTION

At a recent meeting of the Birmingham and Midland Chamber of Agriculture, a resolution was passed urging the more frequent inspection of dairy herds, and that financial assistance should be given to enable owners to isolate their herds.

Mr. L. C. Tipper, M.R.C.V.S., Chairman, who raised the question of a clean milk supply, stressed the importance of an increase in the frequency of inspection. Sufficient part-time officials from among the local practitioners, acting under the chief veterinary inspector of a local authority, should be appointed regularly and systematically to inspect every dairy. It was

proved that by isolation of herds and selection over a period of years, avoiding the introduction of new blood, some diseases could be eliminated. The Government, he said, might provide financial assistance in this respect.

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LONDON MILK SUPPLY

At a meeting of the London County Council, held on Tuesday, the Central Public Health Committee submitted a report on the milk supply of London, and recommended that it should be sent to the Ministers of Health and Agriculture with the request that they should urge upon the county councils concerned the importance of ensuring a supply free from contaminating organisms.

Dr. Somerville Hastings moved an amendment to refer the report back to the committee with an instruction "to consider and report whether the only certain way of securing a clean milk supply is to convert milk production and distribution into an appropriate form of public service." He said that it seemed impossible to sterilise the large glass-lined tanks in which milk was now brought to London. The report seemed to show that infected milk was steadily increasing. The commercial pasteurisation of dirty milk could not make bad milk good.

Dr. Barrie Lambert, Chairman of the committee, said that the milk supply of London was bad, especially since the introduction of tank carriage. When milk arrived in churns it was possible to get into touch with the farms and deal with the trouble. That was now impossible.

The amendment was lost and the recommendation agreed to.

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PROTECTION OF WILD LIFE IN AFRICA

Lord Onslow, presiding on Tuesday last at the first session of the International Conference for the Protection of the Fauna and Flora of Africa, which is being held at the House of Lords, explained that the draft convention had been prepared by the British Government as a possible basis for discussion, pointing out that it was open to amendment and modification. There were articles dealing with the creation of national parks in order to secure permanency, so far as permanency could be secured. If an area was devoted to the preservation of natural flora and fauna on a permanent basis there was every inducement to the local authority to develop it and spend money upon it. The British delegates believed that the creation of national parks was probably the most important step in a scheme of preservation; but when national parks were established it must be recognised that the rights of man must come first. The convention dealt also with the creation of reserves, which were preliminary steps to national parks, or might be supplementary to them, and with species (which it was proposed to schedule) in immediate danger of extinction. Tentative suggestions were made for the solution of the difficulty about trophies, and one article dealt with aircraft. In the view of the British Government nothing should be included in the convention which would hinder the proper and legitimate development of aerial navigation and communication.

The conference agreed to adopt the British draft convention as the basis of their discussion, and appointed a committee of experts from the several delegations to report on the list of species of animals and plants to be recommended for special protection.

Baron de Cartier, the Belgian Ambassador, was elected Vice-President of the conference.

Correspondence

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

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A PASTORAL UTOPIA

To the Editor of The Veterinary Record

Sir,—The necessary brevity of my letter in your issue of October 28th lays me open on the one hand to the charge of sweeping generalisation, and on the other hand to prejudice against the medical profession—one observes in the same issue of your journal a charge, against a greater than I, of generalisation, for less reason. I shall therefore be grateful, Sir, if you would grant me space for the following additional matter which, if published, would absolve a not unimportant argument from a charge of insufficiency, and my goodwill from a suggestion of prejudice.

The veterinary investigation of cattle diseases in the South Sea Islands brought me to Mokogai, the island used solely for the segregation and care of lepers from the Fiji and other islands under British administration in the Western Pacific. Mokogai is about 16 miles by sea from Levuka, the once-prosperous trading capital on the mainland of Vanja Levu, and is effectually isolated from other islands by locality and policy. The climate is pleasant—the humidity not being great.

At the time of my visit (1920) the island was in sole charge of Dr. Hall, of the Colonial Service, who had then lived on the island as Medical Officer for about 16 years. He was, in effect, monarch of all he surveyed and had at his disposal abundant volunteer "labour" and ample land of a fairly fertile sort for experimental farming, together with sufficient funds for reasonable development.

Among other benevolent activities enthusiastically undertaken for the welfare and diversion of his otherwise unfortunate community, he had established a herd of cattle which supplied fresh milk and meat.

The herd had been formed by bringing stock from Vanja Levu and by breeding. The greatest care was taken to practise the principles of clinical control: the calves were removed early from the cows and kept apart. They were not allowed to breed too young. The animals were maintained at all times in excellent condition by careful paddocking and feeding which included the cultivation and artificial manuring of suitable grasses (paspalums and panicums), as well as the manufacture of a rough feeding meal or "cake" from home-grown cocoanut, sugar cane and millet.

The result was that the herd was, so far as could be ascertained by individual inspection and a study of Dr. Hall's records, completely free from any sort of disease.

In the course of the entire investigation, which lasted many months and included the individual inspection of more than 30,000 cattle distributed over an area the size of Wales, Dr. Hall's herd of animals was the only herd of any consequence found to be completely free from tuberculosis.

The nearest approximation to this state of clinical perfection was found, as might be supposed, where individual planters or overseers had exercised to the fullest possible extent, and to the best of their limited ability, under favourable conditions of environment, the principles practised in expert fashion by Dr. Hall.

XUM

My week on Mokogai as the guest of Dr. Hall was an instructive and encouraging experience. The same thoroughness and attention to detail which had enabled this practical scientist and eugenist to establish and maintain a disease-free herd of cattle had also kept his dogs free from the elsewhere fatal filaria immitis. His were the only healthy lot of dogs over two years of age I saw in the South Sea Islands.

Dr. Hall saw to it personally that every day all the dogs were safely in their kennels behind metal mosquito-proof gauze before sundown.

He kept himself and his family free from possible fly-borne and mosquito-borne leprosy infection by hanging thick masses of a sort of light grassy fibre over each doorway, through which one had to dive when entering the house or another room.

This pastoral Utopia, created by the enthusiasm of a medical man who took all well-being for his province, will always live in my memory as a shining example of what is possible—*where the needful facilities exist, of which the first and foremost essential is the undisputed power of complete veterinary control over every aspect and detail of the enterprise, by a man who can give his whole time and energy to the work.*

Yours faithfully,

London. WAKEFIELD RAINEY.

October 29th, 1933.

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THE N.V.M.A.

To the Editor of The Veterinary Record

Sir,—I have been waiting to see if Professor Buxton's remarks at Llandudno would be taken up, but, with the exception of Mr. Mayall's, all comment is absent.

On surveying the work the N.V.M.A. has done in the last eleven years can one really come to the conclusion that all the work the pioneers put in has been worth while?

I cannot call to mind any *constructive* work for the *benefit of the profession as a whole.* This may be due to the apathy of the profession, and I think it is. Not half of the members on the register of the R.C.V.S. are members of the N.V.M.A.—500 new members in eleven years!

There must be something fundamentally wrong. What is it? On thing has been, in my opinion, that there has been no foresight as to the trend of events, especially during the last few years, on the part of the Council, for, as Professor Buxton pointed out, the present system of administration was to refer all things to Commissions.

The profession was not officially represented or even consulted by the Grigg Commission. Why? The answer is want of foresight; yet someone in the profession must have been cognisant of the Reorganisation Commission for Milk, otherwise these recommendations for whole-time service at the expense of the general practitioner would never have been made.

Professor Buxton's warning shows that one man, at least, has the foresight to visualise what the fate of the profession in the near future will be if this fatal lethargy is not thrown off.

Will Professor Buxton again take the lead and hoist the profession, *by means of the majority, i.e.*, the general practitioners, to its proper elevation and its place in the sun?

In this connection may I refer readers to my petition to the Council of the N.V.M.A. for the recognition of general practitioners in carrying out inspections under the Milk and Dairies Acts and Orders. If these were not carried out by general practitioners I foretold the death of country practice and even of the profession itself. I said: "It is the writing on the wall, and unless the Government of our profession makes a firm stand, bureaucracy is the only future of our profession—a Soviet régime is inevitable."

Fortunately, the Divisions were solid in their mandate that the general practitioner, in the words of Sir George Newman, should be, as he always has been, "the first line of defence." Let the Council, and especially the members of committees, keep this always to the front in their deliberations. *Without the full participation of the general practitioners the profession will die—it is already on the verge of breakdown.*

Professor Buxton goes on to say: "In the not far distant future, and if we are not very careful, we shall be known, not as the Cinderella of the professions, but as the handmaiden of every miserable Government Department." He could have gone further and said that we should be the handmaiden of every miserable Medical Officer of Health, because the County Council of Middlesex in the same issue of *The Veterinary Record* (October 14th, 1933), advertising for a whole-time veterinary inspector, makes it a *sine quâ non* that "*the officer appointed will act under the supervision and control of the County Medical Officer of Health.*"

I have the honour to be, Sir,
Your obedient servant,
J. W. HALL MASHETER.

Ruddle House,
Newnham-on-Severn.
October 23rd, 1933.

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ANIMAL PSYCHOLOGY AND "CRUELTY"

To the Editor of The Veterinary Record

Sir,—Although Mr. A. G. Doherty admits that the psychological relation between the consciously appreciated stimulus and the physiological reaction controlled by the subconscious is of the greatest importance to the veterinary profession, yet he seems to have failed to appreciate the real theme of my letter. It is for this reason that I venture to submit a further note on the subject.

For all practical purposes we must accept the dictum of Professor Craig as a matter of fact; namely, that the animal is incapable of reasoning.

Now, although there is no ability in an animal to reason deductively, yet its instinctive ability to "sense" is more highly developed than that in man. Distress suffered by an animal is a physiological interpretation of the psychological reaction of the body to the commands of the instinct, and when the instinct of fear is stimulated by the avoidable action of man, then the distress amounts to a positive degree of cruelty.

It is on this point that academic discussion would lead to a better appreciation of the real meaning of cruelty by the lay mind. Many of the practical difficulties of the bench and professional witnesses would be lessened when full and scientific investigation has been made into the realms of animal psychology.

Yours faithfully,
J. N. H. BACON.

Royal Veterinary College,
Camden Town, N.W.1.

The Editor acknowledges, with thanks, the receipt of the following:—

Communications from Messrs. W. A. Campbell (Boroughbridge), A. Fulton (at Gateside, Fife), W. T. Hewetson (Brampton), Henry Taylor (Hayward's Heath).